

DEPARTMENT OF CIVIL ENGINEERING

(Courses for Multiple Entry-Multiple Exit, Multidisciplinary and Specialized Minors, Honors and Research)

According to this curricular framework of the B. Tech Curriculum Structure in accordance with NEP2020, a complete set of courses for different learners to opt for 1-Year UG Certificate, 2-Year UG Diploma in respective Major Programme and 3-Year B.Sc degree

A. Courses for Minors

Totally 170 credits are required to earn an undergraduate engineering degree which includes a Multidisciplinary Minor in Civil of 14 Credits from one of the stream.

Course	Course Name	L	T	P	Credits
Stream 1-Surveying and its application					
2CVSA21	Satellite Geodesy	2			2
2CVSA30	Global Navigation Satellite Systems	3			3
2CVSA32	Remote Sensing and GIS	3			3
2CVSA40	DGPS Survey	3			3
2CVSA41	Project				3
Stream 2-Environment Engineering					
2CVEN31	Air Pollution Control	2			2
2CVEN33	Water and Waste Water Engineering	3			3
2CVEN32	Solid Waste Management	3			3
2CVEN41	Environmental Impact Assessment	3			3
2CVEN42	Project				3

B. Courses for Double Minor (Specialization Minor)

An additional 14 credits are required to earn under Honors in Structural Engineering or Sustainability Engineering to get eligible for Under Graduate engineering degree with Honors – Double Minor (Specialization Minor).

Course Name	Platform	Credits
Stream 1- Structural Engineering		
Foundation Engineering	Coursera / NPTEL/ MOOC	2
Bridge Engineering		3
Finite Element Analysis		3
Structural Dynamics		3
Project		3
Stream 2-Sustainability Engineering		
Basics of Sustainable Development		2
Life Cycle Analysis		3
Waste management for Smart Cities		3
Green product development		3
Project		3

C. Courses for Honours

An additional 18 credits are required to earn under **Honors in Construction Technology** to get eligible for **Under Graduate Engineering degree with Honors**.

Course Name	Platform	Credits
Mechanics Of Materials	Coursera / NPTEL/ MOOC	3
Admixtures And Special Concretes		
Introduction to Multimodal Urban Transportation Systems (MUTS)		
Safety in Construction		3
Availability and Management Of Groundwater Resources		
Introduction to Accounting and Finance for Civil Engineers		
Integrated Waste Management For A Smart City		3
Water Economics And Governance		
Rock Mechanics And Tunneling		
Advanced Foundation Engineering		3
Energy Efficiency, Acoustics and Daylighting in Building		
Introduction to Lean Construction		
Report Writing based on all the previously completed courses		6

D. Courses for Honors with Research

An additional 18 credits are required to earn under **Honors with Research** to get eligible for **Under Graduate Engineering degree with Honors with Research**

Course Name	Credits
Research Methodology	4
Dissertation in Sem VII and Sem VIII	14

E. Compulsory Courses for Multiple Entry-Multiple Exits

- Certified Draftmans Engineer – CAD Competency Course (1-Year UG Certificate)

Course Name	L	T	P	Credit
Measurement and Planning	3			2
CAD Competency			6	3
Project using CAD			6	3

- Certified Valuator Engineer – Estimation and Valuation Certification (2-Year UG Diploma)

Course Name	L	T	P	Credit
Estimation and Valuation	3			2
Softwares competency for Estimation.			6	3
Project			6	3

- Certified Civil/Site Supervisor Engineer - Three Month Internship into MNC Company Certifications (3 Year B.Sc degree)


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Dean Academics


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Annasaheb Dange College of Engineering and Technology Ashta
Department of Civil Engineering
 Teaching and Evaluation Scheme



Course Code	Course Name	Teaching Scheme						THEORY						PRACTICAL						GRAND TOTAL
		L	T	P	Credits	ISE		MSE+ ESE			Total	Min	ISE		ESE		Total	Min		
						Max	Min	MSE	ESE	Min			Max	Min	Max					
						Min	Max	Min	Max	Min			Max	Min	Max					
2CVBS101	Applied Mathematics - I	3	1		4	40	16	30	30	24	100	40	-	-	-	-	-	100		
2CVBS102	Applied Physics	3	-	-	3	40	16	30	30	24	100	40	-	-	-	-	-	100		
2CVPC103	Applied Mechanics	3	-	-	3	40	16	30	30	24	100	40	-	-	-	-	-	100		
2CVES104	Engineering Graphics	2	-	-	2	40	16	30	30	24	100	40	-	-	-	-	-	100		
2CVHS105	Professional Communication Skills	-	-	4	2	-	-	-	-	-	-	-	-	50	20	-	-	50	50	
2CVBS106	Applied Physics Laboratory	-	-	2	1	-	-	-	-	-	-	-	-	50	20	-	-	50	50	
2CVPC107	Applied Mechanics Laboratory	-	-	2	1	-	-	-	-	-	-	-	-	50	20	-	-	50	50	
2CVES108	Engineering Graphics and CAD Laboratory	-	-	4	2	-	-	-	-	-	-	-	-	50	20	-	-	50	50	
2CVES109	Design Thinking Laboratory	1	-	2	2	-	-	-	-	-	-	-	-	50	20	-	-	50	50	
2CCHS110	Value Added Course-I	-	-	2	1	-	-	-	-	-	-	-	-	50	20	-	-	50	50	
	Total Contact Hours	12	1	16	21														700	

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Department of Civil Engineering
 Teaching and Evaluation Scheme



Course Code	Course Name	Teaching Scheme										THEORY						PRACTICAL						GRAND TOTAL										
		L			T			P			Credits			ISE		MSE+ ESE		Total		Min		Max			Min		Max		Min		Max			
														Max	Min	MSE	ESE	Min	Max	Min	Max	Min	Max		Min	Max	Min	Max	Min	Max				
2CVBS111	Applied Mathematics - II	3	1	-	-	4	16	30	30	24	40	16	30	30	24	100	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
2CVBS112	Applied Chemistry	3	-	-	-	3	16	30	30	24	40	16	30	30	24	100	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
2CVPC113	Fundamentals of Civil Engineering	4	-	-	-	4	16	30	30	24	40	16	30	30	24	100	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
2CVES114	Basic Electrical Engineering	2	-	-	-	2	16	30	30	24	40	16	30	30	24	100	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
2CVBS115	Applied Chemistry Laboratory	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	20	-	-	50	20	-	-	50	20	-	-	50
2CVPC116	Fundamentals of Civil Engineering Laboratory	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	20	-	-	50	20	-	-	50	20	-	-	50
2CVES117	Basic Electrical Engineering Laboratory	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	20	-	-	50	20	-	-	50	20	-	-	50
2CVES118	Programming for Problem Solving Laboratory	1	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	20	50	20	50	20	50	20	100	40	100	40	100
2CVHS119	Value added course- II	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	20	-	-	50	20	-	-	50	20	-	-	50
	Total Contact Hours	13	1	10	10	19																												700

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Course Code	Course Name	Teaching Scheme					THEORY						PRACTICAL						GRAND TOTAL
		L		P		Credits	ISE		MSE+ ESE		Total	Min	ISE		ESE		Total	Min	
							Max	Min	MSE	ESE			Min	Max	Min	Max			
2CVPC201	Differential Equation and Calculus	2	1	-	2	3	40	16	30	30	24	100	40	-	-	-	-	-	100
2CVPC202	Structural Mechanics	3	-	2	4	4	40	16	30	30	24	100	40	50	20	-	-	50	150
2CVPC203	Building Design and Drawing	3	-	2	4	4	40	16	30	30	24	100	40	50	20	50	20	50	200
2CVPC204	Surveying	3	-	2	4	4	40	16	30	30	24	100	40	50	20	50	20	50	200
2CVPC205	Hydrology & Irrigation Engineering	3	-	-	3	3	40	16	30	30	24	100	40	-	-	-	-	-	100
2CVHS206	Environment Studies	2	-	-	2	2	50	20	-	-	-	50	20	-	-	-	-	-	50
2CVHS207	Universal Human Values	2	-	-	2	2	50	20	-	-	-	50	20	-	-	-	-	-	50
2CVCC208	Aptitude And Reasoning Part - I	-	-	2	1	1	-	-	-	-	-	-	-	50	-	-	-	-	50
	Total Contact Hours	18	1	8	23														900

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 Teaching and Evaluation Scheme



S. Y. B. Tech Semester IV

Course Code	Course Name	Teaching Scheme						THEORY						PRACTICAL						GRAND TOTAL
		L	T	P	Credits	ISE		MSE+ESE			Total	Min	ISE		ESE		Total	Min		
						Max	Min	Max	MSE	ESE			Min	Max	Min	Max			Min	
2CVPC209	Fluid Mechanics	3	-	2	4	40	16	30	30	24	100	40	50	20	50	20	100	40	200	
2CVPC210	Concrete Technology	3	-	2	4	40	16	30	30	24	100	40	50	20	-	-	50	20	150	
2CVPC211	Structural Analysis	3	-	-	3	40	16	30	30	24	100	40	-	-	-	-	-	-	100	
2CVPC212	Construction Management & Economics	2	-	-	2	40	16	30	30	24	100	40	-	-	-	-	-	-	100	
2CV**2**	Minor Course -I	2	-	-	2	40	16	30	30	24	100	40	-	-	-	-	-	-	100	
2CVHS215	Psychology	2	-	-	2	50	20	-	-	-	50	20	-	-	-	-	-	-	50	
2CVHS216	Constitution of India	1	-	-	1	50	20	-	-	-	50	20	-	-	-	-	-	-	50	
2CVPC217	Building Planning and Drawing Laboratory	-	-	2	1	-	-	-	-	-	-	-	50	20	50	20	100	40	100	
2CVCC218	Apitude And Reasoning Part - II	-	-	2	1	-	-	-	-	-	-	-	50	20	-	-	50	20	50	
2CVEL219	Product Development Laboratory	-	-	2	1	-	-	-	-	-	-	-	50	20	-	-	50	20	50	
2CVES220	General Proficiency	-	-	2	1	-	-	-	-	-	-	-	50	20	-	-	50	20	50	
Total Contact Hours		16	0	12	22							28							1000	

Minor Course - I (Semester IV)			
Sr. No.	Course Code	Minor Course- I	Domain
1	2CVSA213	Satellite Geodesy	Surveying and Its Applications
2	2CVEN214	Air Pollution Control	Environment Engineering

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Department of Civil Engineering
 Teaching and Evaluation Scheme

ADCEET

T. Y. B. Tech Semester V

Course Code	Course Name	Teaching Scheme					THEORY						PRACTICAL						GRAND TOTAL			
		L		T		P	Credits	ISE		MSE+ESE			Total	Min	ISE		ESE			Total	Min	
				Max	Min			Max	Min	MSE	ESE	Min			Max	Min	Max	Min				Max
2CVOE3#	Open Elective-1	3	-	-	3	-	3	50	20	-	-	-	-	50	20	-	-	-	-	-	-	50
2CVVS101	Design of Steel Structures	3	-	-	3	-	3	40	16	30	30	24	100	40	-	-	-	-	-	-	-	100
2CVPC302	Geotechnical Engineering	3	-	2	4	-	4	40	16	30	30	24	100	40	50	20	50	20	100	40	40	200
2CVPC303	Infrastructure Engineering	3	-	2	4	-	4	40	16	30	30	24	100	40	50	20	50	20	100	40	40	200
2CVPE3**	Program Elective-1	2	-	-	2	-	2	40	16	30	30	24	100	40	-	-	-	-	-	-	-	100
2CV**3**	Minor Course - II	3	-	-	3	-	3	40	16	30	30	24	100	40	-	-	-	-	-	-	-	100
2CVEL311	In Plant Training	-	1	-	1	-	1	-	-	-	-	-	-	-	50	20	-	-	50	20	20	50
2CVHS312	Entrepreneurship	-	-	2	1	-	1	-	-	-	-	-	-	-	50	20	-	-	50	20	20	50
2CVCC313	Reasoning and Soft Skill Part - III	-	-	2	1	-	1	-	-	-	-	-	-	-	50	20	-	-	50	20	20	50
	Total Contact Hours	17	1	8	22		26															900

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Raymanis
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Program Elective - I (Semester V)		
	Course	Domain
2CVPE304	Composite Materials	Structural Engineering
2CVPE305	Investment Planning and Management	Construction Management
2CVPE306	Public Health Engineering	Environment Engineering
2CVPE307	Site Investigation Methods & Practices	Geotechnical and Transportation Engineering
2CVPE308	Remote sensing	Geoinformatics & Geology

Minor Course - II (Semester V)		
	Minor Course- II	Domain
2CVSA309	Global Navigation Satellite Systems	Surveying and Its Applications
2CVEN310	Water and Waste Water Engineering	Environment Engineering

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Program Elective - II (Semester VI)		
Course	Laboratory	Domain
2CVPE317	Structural Audit Laboratory	Structural Engineering
2CVPE318	Safety Aspects in Civil Engineering Laboratory	Construction Management
2CVPE319	Sustainable Management of Solid Waste	Environment Engineering
2CVPE320	Ground Improvement Techniques	Geotechnical and Transportation Engineering
2CVPE321	Engineering Geology	Geoinformatics & Geology

Minor Course - III (Semester VI)		
Sr. No.	Course Code	Domain
1	2CVSA322	Remote Sensing and GIS
2	2CVEN323	Solid Waste Management

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Annasaheb Dange College of Engineering and Technology Ashta
Department of Civil Engineering
 Teaching and Evaluation Scheme



Course Code	Course Name	Teaching Scheme						THEORY						PRACTICAL						GRAND TOTAL
		L		P		Credits		ISE		MSE+ ESE		Total		Min		ESE		Total		
								Max	Min	MSE	ESE	Min	Min	Max	Min	Max	Min	Max	Min	
2CVOE4##	Open Elective-III	2	-	-	2	2	50	20	-	-	-	50	20	-	-	-	-	-	-	50
2CVPC401	Earthquake Resistant Structures	3	-	-	3	3	40	16	30	30	24	100	40	-	-	-	-	-	-	100
2CVVS402	Quantity Surveying and Valuation	3	-	2	4	4	40	16	30	30	24	100	40	50	20	50	20	100	40	200
2CVHS403	Project management and Finance	2	-	-	2	2	40	16	30	30	24	100	40	-	-	-	-	-	-	100
2CVPE4**	Program Elective-III	3	-	2	4	4	40	16	30	30	24	100	40	50	20	-	-	50	20	150
2CV**4**	Minor Course - IV	3	-	-	3	3	40	16	30	30	24	100	40	-	-	-	-	-	-	100
2CVVS411	Structural Design and Drawing II Lab	-	-	4	2	-	-	-	-	-	-	-	-	50	20	50	20	100	40	100
2CVEL412	Software Training II	-	-	2	1	-	-	-	-	-	-	-	-	50	20	-	-	50	20	50
2CVEL413	Project Phase I	-	-	4	2	-	-	-	-	-	-	-	-	100	40	-	-	100	40	100
Total Contact Hours		16	0	14	23															950

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Bonmaris

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Program Elective - III (Semester VII)		
Course	Laboratory	Domain
2CVPE404	Repair & Rehabilitation of Structures laboratory	Structural Engineering
2CVPE405	Advanced Construction Techniques laboratory	Construction Management
2CVPE406	Air Pollution & Control laboratory	Environment Engineering
2CVPE407	Pavement Design & Analysis laboratory	Geotechnical and Transportation Engineering
2CVPE408	GIS & its Applications in Civil Engineering laboratory	Geoinformatics & Geology

Minor Course - IV (Semester VII)		
Sr. No.	Course Code	Domain
1	2CVSA409	Surveying and its Applications
2	2CVEN410	Environment Engineering

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Sayamanta
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Final Year B. Tech Semester VIII

Course Code	Course Name	Teaching Scheme						THEORY						PRACTICAL						GRAND TOTAL	
		L		T		P		ISE		MSE+ ESE		Total Min		ESE		ESE		Total Min			
2CVPC4**	Program Elective-IV (MOOC)	2	-	-	2	40	16	30	30	24	100	40	-	-	-	-	-	-	-	-	100
2CV**4**	Minor Project	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
2CVEL421	Project Phase II	-	-	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200
2CVEL422	Internship	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200
Total Contact Hours		2	0	4	17																600

Program Elective - IV (MOOC)

Course Code	Course	Domain
2CVPC414	Advanced Structural Design	Structural Engineering
2CVPC415	Human Resource Development	Construction Management
2CVPC416	Ecological Design and Impact Analysis	Environment Engineering
2CVPC417	Pavement Design & Analysis	Geotechnical and Transportation Engineering
2CVPC418	Watershed Management	Geoinformatics & Geology

Minor Course - V (Semester VIII)

Sr. No.	Course Code	Minor Course- I	Domain
1	2CVSA419	PROJECT	Surveying and its Applications
2	2CVEN420	PROJECT	Environment Engineering

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Annasaheb Dange College of Engineering and Technology Ashta
Department of Civil Engineering



B. Tech Program with One Major and One Minor (170 Credits)

Course Category	I	II	III	IV	V	VI	VII	VIII	Total
Basic Sciences	8	8							16
Engineering Science	6	5		1					12
Program Core	4	5	18	14	7	10	5	0	63
Program Elective					3	4	4	2	13
Minor				2	3	3	3	3	14
Open Elective					3	3	2		8
Vocational and Skill Enhancement Courses					3	1	4		8
Humanities and Social Sciences	3	1	4	3	1		2		14
Experiential Learning Courses				1	1	1	3	12	18
Co-curricular Courses			1	1	1	1			4
Total	21	19	23	22	22	23	23	17	170

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**Annasaheb Dange College of Engineering and Technology Ashta
Department of Civil Engineering
Details of Minor, Specialization Minor and Honors Program**

Certification Course after F.Y. Sem II

Course Code	NEP	Course Name	L	T	P	Credits
	VOC	Measurements and Planning	3			2
	VOC	CAD Competency			6	3
	VOC	Project using CAD			6	3
Total						8

Vocational Course after S.Y. Sem IV

Course Code	NEP	Course Name	L	T	P	Credits
	VOC	Estimation and Valuation	3			2
	VOC	Software's competency for Estimation.			6	3
	VOC	Project			6	3
Total						8

Internship after T.Y. Sem VI

Course Code	NEP	Course Name	L	T	P	Credits
	VOC	Three Month Internship into MNC Company				8
Total						16

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Head of Department

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Annasah Dange College of Engineering and Technology Ashta
Department of Civil Engineering
Honors by Discipline

Honors in Construction Technology

Honors Course after S.Y. Sem IV						
Course Code	NEP	Course Name	L	T	P	Credits
	VOC	Mechanics Of Materials				3
		Admixtures And Special Concretes				
		Introduction to Multimodal Urban Transportation Systems (MUTS)				
Total						3

Honors Course after T.Y. Sem V						
Course Code	NEP	Course Name	L	T	P	Credits
	VOC	Safety in Construction				3
		Availability and Management Of Groundwater Resources				
		Introduction to Accounting and Finance for Civil Engineers				
Total						3

Honors Course after T.Y. Sem VI						
Course Code	NEP	Course Name	L	T	P	Credits
	VOC	Integrated Waste Management For A Smart City				3
		Water Economics And Governance				
		Rock Mechanics And Tunneling				
Total						3

Honors Course after B. Tech. Sem VII						
Course Code	NEP	Course Name	L	T	P	Credits
	VOC	Advanced Foundation Engineering				3
		Energy Efficiency, Acoustics and Daylighting in Building				
		Introduction to Lean Construction				
Total						3

Honors Course after B. Tech. Sem VIII						
Course Code	NEP	Course Name	L	T	P	Credits
	VOC	Report Writing based on all the previously completed courses				3
Total						3

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Department of Civil Engineering
Honors by Research

Course Code	NEP	Course Name	L	T	P	Credits
		Research Methodology	4			4
		Dissertation in Sem VII and Sem VIII			28	14
Total						18

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Head of Department

Bhargava

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Annasaheb Dange College of Engineering and Technology Ashta
Department of Civil Engineering
Double Minors

Stream 1 - Structural Engineering						
Course Code	NEP	Course Name	L	T	P	Credits
	Coursera / NPTEL/ MOOC	Foundation Engineering				2
		Bridge Engineering				3
		Finite Element Analysis				3
		Structural Dynamics				3
		Project				3
Total						14

Stream 2 - Sustainability Engineering						
Course Code	NEP	Course Name	L	T	P	Credits
	Coursera / NPTEL/ MOOC	Basics of Sustainable Development				2
		Life Cycle Analysis				3
		Waste management for Smart Cities				3
		Green product development				3
		Project				3
Total						14

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Ramkrishna
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Satish
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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVBS101, Applied Mathematics I
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial	3/1
Credits	4
Evaluation Scheme: ISE / MSE / ESE	40 / 30 / 30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVBS101_1	Solve the system of linear equations by using matrix method and numerical techniques.
2CVBS101_2	Calculate Eigen values and Eigen vectors and power of matrix by using Cayley-Hamilton theorem
2CVBS101_3	Fit the curves for bivariate data by applying least square techniques.
2CVBS101_4	Apply Taylor series to find the expansion of functions.
2CVBS101_5	Compute the n^{th} power and roots of the complex number by using De-Moivre's Theorem.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Matrices and Solution of Linear System Equations: Rank of a matrix, Normal form of a matrix, echelon form, Consistency of linear system of equations (system of homogeneous and non-homogeneous linear equation).	07
Unit 2	Eigen Values and Eigen Vectors: Vectors, Linear dependence and linear independence of vectors, Eigen values, Properties of Eigen values, Eigen vectors, Properties of Eigen vectors, Cayley-Hamilton Theorem (Inverse and Higher powers of matrix).	08
Unit 3	Numerical Solution of System of Simultaneous Linear Equations: Gauss Elimination Method, Gauss-Jordan Method, Iterative Method – Gauss Jacobi method and Gauss Seidel method, Eigen value using Power method.	06
Unit 4	Statistics and Curve fitting: Method of Least Squares, Fitting of Straight Line, Fitting of Parabola, Fitting of exponential curves, Lines of Regression.	06
Unit 5	Expansion of Functions and Indeterminate Forms: Taylor's series, Maclaurin's series, Standard expansions, Expansion of function using Standard series, Indeterminate forms.	07
Unit 6	Complex Numbers: De Moivre's theorem, Roots of a complex number, Expansion of $\sin(nx)$ and $\cos(nx)$ in powers of $\sin x$ and/or $\cos x$, Circular functions of a complex variable, Hyperbolic functions, relation between circular and hyperbolic functions, Inverse Hyperbolic functions.	08


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Sr. No.	Title of Tutorials
1	Matrices and Solution of Linear System Equations: Normal form, system of homogeneous linear equation.
2	System of non- homogeneous linear equation.
3	Eigen Values and Eigen Vectors.
4	Cayley-Hamilton Theorem.
5	Numerical Solution of System of Simultaneous Linear Equations:
6	Curve Fitting I: Fitting of Straight Line and Fitting of Parabola.
7	Curve Fitting II: Fitting of exponential curves and Lines of Regression.
8	Expansion of function.

Text Books

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Numerical Methods in Engineering & Science	Dr. B. S Grewal	Khanna Publishers	9 th	2010
02	Advanced Engineering Mathematics	H. K. Das	S. Chand	22 nd	2018
03	A textbook of Applied Mathematics	P.N. Wartikar & J. N. Wartikar	Pune Vidyarthi Griha Prakashan	1 st	2008
04	Higher Engineering Mathematics	B. V. Ramana	Tata McGraw Hill Publ.	6 th	2010

Reference Books / Handbooks

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Higher Engineering Mathematics	Dr. B. S. Grewal	Khanna Publishers	44 th	2018
02	Advanced Engineering Mathematics	N. P. Bali, Manish Goyal	Infinity science press	7 th	2010
03	Advanced Engineering Mathematics	Erwin Kreyszig	Wiley Publishers	10 th	2017
04	Numerical Methods	Dr. P. Kandasamy, Dr. K. Thilagavathy, Dr. K. Gunavathi	S. Chand	1 st	2010



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Course Details:

Class	F. Y. B. Tech, Sem -I
Course Code and Course Title	2CVBS102, Applied Physics
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial	3/0
Credits	3
Evaluation Scheme: ISE / MSE / ESE	40 / 30 / 30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVBS102_1	Apply suitable optical theory to determine wavelength and divergence of monochromatic and polychromatic sources of light using relevant optical methods of testing.
2CVBS102_2	Calculate the interplaner spacing, lattice constant and properties of unit cell for a given crystal system based on the crystallographic study using laws of material science.
2CVBS102_3	Use concept of Nanotechnology to express Production technique and tools of nano material using different synthesis methods and microscopes.
2CVBS102_4	Solve engineering problems based on Architectural acoustics and Ultrasonic's using appropriate theories and formulae.
2CVBS102_5	Apply principles of Quantum mechanics to calculate observables on known wave functions using fundamental quantum mechanical processes in nature.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Wave Optics : Diffraction:- Introduction, construction of plane diffraction grating, Diffraction at multiple slits, Determination of wavelength of particular colour using plane diffraction grating, Resolving power of grating, Numericals. Polarization:- Polarization of light, Polarization by double refraction, Positive and Negative crystals, Optical activity, Laurent's half shade Polarimeter, Numericals.	06
Unit 2	Laser and Fibre Optics : Laser: Introduction to laser, Laser and ordinary light, Interaction of radiation with matter- Absorption, Spontaneous emission, Stimulated emission, Pumping (Three level and four level), Population inversion, Metastable state, Laser beam Characteristics, Solid State laser (Ruby Laser), Industrial and medical applications of laser, Holography- Difference between ordinary photography and Holography, Construction and reconstruction of Hologram. Optical fibre: Introduction, Basic principle (total internal reflection), Structure of optical fibre, Propagation of light through optical fibre, Acceptance angle and acceptance cone (no derivation), Fractional refractive index change, Numerical aperture (no derivation), Classification of optical fibre, Advantages and disadvantages of optical fibre, Applications of optical fibres, Numericals.	08

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Unit 3	<p>Structure of Solids and its Characterization: Crystalline state, Lattice, Space lattice, Basis and crystal structure, Unit cell, lattice parameters, Crystal system in brief, (Cubic, Monoclinic..Triclinic), Fourteen Bravais lattices, Properties of unit cell (number of atoms per unit cell, coordination number, atomic radius, packing fraction), Calculation of lattice constant (Relation between lattice constant and density), Symmetry elements in cubic crystal, Miller indices:- Procedure, Features and Sketches for different planes. X-ray diffraction (Laue method), Bragg's law, Bragg's X-ray diffractometer, Numericals.</p>	08
Unit 4	<p>Nano Physics: Introduction, Concept of nanotechnology, Production techniques:- Top-down (eg. Ball milling) and Bottom-up (eg. Sol-gel process), Tools – Scanning Electron Microscope (SEM) and Atomic Force Microscope (AFM), Applications of nano- materials, Carbon Nano Tube (CNT):- Structure, two types, properties and applications.</p>	06
Unit 5	<p>Architectural acoustics and Ultrasonic : Architectural Acoustics: Introduction, Basic requirements for acoustically good hall, Reverberation, Time of Reverberation, Sabine's formula (no derivation), Absorption coefficient, Factors affecting the architectural acoustics and their remedy, Numericals. Ultrasonic waves: Introduction, Properties of ultrasonic waves, Production of ultrasonic waves by magnetostriction method, Determination of wavelength and velocity of ultrasonic waves by using acoustic diffraction method, Detection of ultrasonic waves, Applications of ultrasonic waves, Numericals. Microwaves- Properties, Advantages, Disadvantages and its applications.</p>	07
Unit 6	<p>Quantum Physics: Introduction to Quantum mechanics, Plank's Quantum Theory, Photoelectric Effect, Compton Effect with theory, Wave Particles Duality, Matter waves, Properties of Matter wave, Heisenberg Uncertainty principle for position and momentum of particle, Problems.</p>	07


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Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Physics	G Vijayakumari	Vikas Pub. House (P) Ltd	3 rd	2009
02	A Text Book of Engineering Physics	M.N. Avadhanulu & P. G. Kshirsagar	S. Chand Publication.	12 th	2006
03	Engineering Physics	P. K. Palanisamy	Sci Tech pub. (P) Ltd.	2 nd	2009
04	Introduction to Nano science and Nanotechnology:	K.K. Chattopadhyay and A.N. Banerjee,	PHI Learning	3 rd	2009

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Physics	Resnick Halliday, Krane,	John Wiley & Sons Pub.	8 th	2008
02	Engineering Physics	R. K. Gaur & Gupta S, L	Dhanapat Rai Publication	8 th	2008
03	Solid State Physics:	S. O. Pillai	New Age International Ltd.	6 th	2007
04	Introduction to Solid State Physics	Charles Kittel,	Wiley India Pvt. Ltd	7 th	2008
05	Materials Science and Engineering –	V. Raghvan,	PHI Learning.	5 th	2006
06	Engineering Physics:	D. K. Bhattacharya and A. Bhaskaran,	Oxford University Press	6 th	2010



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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVPC103, Applied Mechanics
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial	3/0
Credits	3
Evaluation Scheme: ISE / MSE / ESE	40 / 30 / 30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVPC103_1	Interpret the resultant force and reactions at support for a force system based on concepts of resolution and composition.
2CVPC103_2	Calculate forces in members of truss under point load with their nature.
2CVPC103_3	Compute moment of inertia for a composite plane lamina by using parallel and perpendicular axis theorem.
2CVPC103_4	Apply the concept of dynamic equilibrium for rigid bodies in motion using principle of kinetics.
2CVPC103_5	Illustrate the motion of rigid bodies after impact using principle of conservation of momentum.

Course Contents:

Unit No.	Title	Hrs
Unit 1	Introduction to Engineering mechanics: Basic concepts - Particle, Body, Rigid body, Force, Types of force systems, Law of transmissibility of force, Resolution of a force, Resultant force, Moment of a force, couple, Varignon's theorem.	06
Unit 2	Equilibrium of forces Concept of equilibrium, Conditions of equilibrium, Free Body Diagram, Law of moment, Introduction to surface friction, Types of Loads, Types of supports, Types of Beams, Analysis of Simple and Compound beams using conditions of equilibrium.	08
Unit 3	Analysis of Truss Introduction of roof truss, Types of Trusses, Determinacy of a Truss, Assumptions for analysis of truss, Analysis of truss using method of Joint and method of Section.	07
Unit 4	Centroid and Moment of Inertia Introduction to Centroid and Center of Gravity, Centroid of plain laminae, Moment of Inertia, Moment of Inertia of Standard shapes from first principle, Parallel and perpendicular axis theorem, Moment of Inertia of plain and composite figures, Radius of Gyration.	07
Unit 5	Kinetics of Linear and Circular motion Equation of linear motion and motion under gravity, Introduction to surface friction, Kinetics of linear motion, D' Alembert's Principle, Work- Energy Principle, Impulse Momentum Principle, Kinetics of Circular Motion, Torque.	08

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Unit 6	Collision Introduction to Phenomenon of Collision, Law of Conservation of Momentum, Newton's law of Collision of Elastic Bodies, Coefficient of Restitution, Types of Collisions, Direct Collision of Two Bodies, Loss of Kinetic Energy During Collision.	06
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Text Books:


Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Mechanics	S. Ramamrutham	Dhanpat Rai Publishing Company (P). Ltd	9 th	2010
02	Engineering Mechanics	R. S. Khurmi	S. Chan	Revised	2006
03	Engineering Mechanics	R. K. Bansal Sanjay Bansal	Laxmi Publications Pvt Ltd.	6 th	2013
04	Engineering Mechanics	K. L. Kumar	Tata McGraw Hill Education	4 th	2012
05	Engineering Mechanics	S. B. Junnarkar	Charotar Publications	16 th	2011
06	Engineering Mechanics	S.S. Bhavikatti	New Age International Pvt. Ltd.	4 th	2012


Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Mechanics	Timoshenko and Young	McGraw Hill Publishers	3 rd	2006
02	Engineering Mechanics	Irving H. Shames	Prentice Hall of India, New Delhi	5 th	2011
03	Vector Mechanics for Engineers Vol. -I and II	F. P. Beer and E. R. Johnson	Tata McGraw Hill Education	6 th	2011
04	Engineering Mechanics: Statics & Dynamics	Ferdinand Singer	Harper and Row Publications	9 th	2009
05	Fundamentals of Engineering Mechanics	S. Rajasekaran	Vikas Publishing House Pvt. Ltd.	3 rd	2005


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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVES104, Engineering Graphics
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial	2/0
Credits	2
Evaluation Scheme: ISE / MSE / ESE	40 / 30 / 30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVES104_1	Sketch projection of simple geometries (curves & Planes).
2CVES104_2	Sketch projection of solids & its sectional views.
2CVES104_3	Produce the orthographic projection.
2CVES104_4	Produce the isometric projection.
2CVES104_5	Prepare Perspective drawing of simple objects.


Course Contents:

Unit No.	Title	Hrs
Unit 1	Fundamental of engineering graphics : Introduction to drawing instrument and their uses. Different types of lines used in drawing practice, the dimensioning system as per BSI. Engineering Curves: Introduction to First angle and third angle methods of projection. Construction of curves used in drawing only Ellipse, Hyperbola and Parabola.	04
Unit 2	Projections of Solids Projections of Prisms, Pyramids, Cylinder and Cones inclined to both reference planes. (Excluding Frustum and Sphere)	06
Unit 3	Sections of Solids : Prisms, Pyramids, Cylinders and Cones in simple positions and inclined to one reference plane and parallel to other.	04
Unit 4	Orthographic projection- Lines used, selection of views, the spacing of views, dimensioning and sections. Drawing required views from given pictorial views (conversion of pictorial views into orthographic views). Including sectional orthographic views	06
Unit 5	Isometric Projections Introduction to isometric. Isometric scale, Isometric projections and Isometric views /drawings. Circles in isometric view. Isometric views of simple solids and objects.	04
Unit 6	Perspective Views Introduction, Simple Objects for Perspective Drawing.	04


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Drawing	N D Batt & V M Panchal	Charotor Publication House, Bombay	50 th	2010
02	Engineering Drawing	Dhananjay A Jhole	Tata Mc-Graw Hill	5 th	2011
03	Fundamentals of Engineering Drawing	Warren. J. Luzadder	Prentice-Hall of India.	11 th	1999
04	Engineering Drawing	P. S. Gill	Katson books	9 th	2012

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Drawing	N D Batt & V M Panchal	Charotor Publication House, Bombay	50 th	2010
02	Engineering Drawing	Dhananjay A Jhole	Tata Mc-Graw Hill	5 th	2011
03	Fundamentals of Engineering Drawing	Warren. J. Luzadder	Prentice-Hall of India.	11 th	1999
04	Engineering Drawing	P S Gill	Katson books	9 th	2012
05	Fundamentals of Engineering Mechanics	S. Rajasekaran	Vikas Publishing House Pvt. Ltd.	3 rd	2005


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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVHS105, Professional Communication Skills
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/4
Credits	2
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS105_1	Exhibit the skill of sentence construction considering the frame of English language rules accurately for effective and sound communication.
2CVHS105_2	Present their portfolio confidently considering SWOT analysis by using digital tools convincingly as per the corporate expectations.
2CVHS105_3	Write formal letters proficiently by following required techniques that helps in maintaining professional affairs at workplace.
2CVHS105_4	Produce professional presentations proficiently on assigned topics in convincing manner using necessary tools and techniques.
2CVHS105_5	Justify own role in communicative events with balanced zeal, in well-organized manner.

List of Experiments

Exp. No.	Title of Experiments
1	Checking My English Communication
2	Self - Introduction
3	Presenting my Career Choices
4	Preparing my Portfolio
5	Enriching Vocabulary
6	Avoiding Common Errors
7	Presenting My Portfolio
8	Note Making
9	Getting Smart with Technical Description of charts/ Images/ Processes
10	Delivering Professional Presentation
11	Application and Resume Writing
12	Email Writing
13	GD (General)
14	Introducing Guest/ Friend
15	Extempore
16	GD (Technical)
17	Mock Interview
18	Organizing an Event


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	The Professional: Defining the New Standard of Excellence at Work	Subroto Bagchi	Penguin Books India Pvt. Ltd.	Revised Edition	2011
02	Cambridge Guide to IELTS	Pauline Cullen, Amanda French	Cambridge University Press	Reprint	2017
03	A Practical Course in Effective English Speaking Skills	J. K. Gangal	PHI Learning Private Limited, New Delhi	Print	2012
04	Personality Development and Soft Skills	Barun K. Mitra	Oxford University Press, New Delhi, India	Seventh Impression	2012

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	High-school English Grammar and Composition	Wren and Martin	S. Chand and Co., New Delhi	1 st	2015
02	The Ace of Soft Skills	Ajai Chowdry, Bala Balchandran	Pearson Publication, Delhi	8 th	2013
03	Effective Technical Communication	M. Ashraf Rizvi	Mc Graw Hill Education, Chennai	Second Edition	2017
04	Business Communication	Hory Sankar Mukerjee	Oxford University Press, New Delhi, India	Second Edition	2013




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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVBS106, Applied Physics Laboratory
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs): Project

Upon successful completion of the project, the student will be able to:

2CVBS106_1	Apply suitable optical theory to calculate wavelength and divergence of monochromatic and polychromatic sources of light using plane diffraction grating.
2CVBS106_2	Calculate band gap energy and Specific rotation for a given semiconductor and sugar solution using appropriate theories and formulae.
2CVBS106_3	Demonstrate symmetries, planes and properties of unit cell for a given crystal system based on the crystallographic study using laws of material science.
2CVBS106_4	Communicate effectively about laboratory work both orally and writing.
2CVBS106_5	Practice professional and ethical behavior to carry forward in their life.

List of Experiments

Exp. No.	Title of Experiments
1	Plane Diffraction Grating
2	Resolving power of Grating
3	Resolving power of telescope
4	Laurent's Half Shade Polarimeter
5	Kund's tube for determination of velocity of sound
6	Divergence of The LASER Beam
7	Wavelength of LASER
8	Inverse Square Law
9	Band Gap energy
10	Seven Crystal System
11	Symmetry Element of Cube
12	Numerical aperture of optical fibre
13	Double Refraction
14	Material Characterization using ultrasound.

Minimum EIGHT experiments should be perform from the above list.


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Text Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Physics	G Vijayakumari	Vikas Pub. House (P) Ltd	3 rd	2009
02	A Text Book of Engineering Physics	M.N.Avadhanulu & P. G. Kshirsagar	S. Chand Publication.	12 th	2006
03	Engineering Physics	P. K. Palanisamy	Sci Tech pub. (P) Ltd.	2 nd	2009
04	Introduction to Nano science and Nanotechnology:	K.K. Chattopadhyay and A.N. Banerjee,	PHI Learning	3 rd	2009

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Physics	Resnick Halliday, Krane,	John Wiley & Sons Pub.	8 th	2008
02	Engineering Physics	R. K. Gaur & Gupta S. L	Dhanapat Rai Publication	8 th	2008
03	Solid State Physics:	S. O. Pillai	New Age International Ltd.	6 th	2007
04	Introduction to Solid State Physics	Charles Kittle,	Wiley India Pvt. Ltd	7 th	2008
05	Materials Science and Engineering –	V. Raghvan,	PHI Learning.	5 th	2006
06	Engineering Physics:	D.K. Bhattacharya and A.Bhaskaran,	Oxford University Press	6 th	2010



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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVPC107, Applied Mechanics Laboratory
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs): Project

Upon successful completion of the project, the student will be able to:

2CVES107_1	Compute resultant and moments of a force system to verify the laws for forces for static state of body.
2CVES107_2	Relate the magnitude of support reactions of a simply supported beam using experimental and analytical method.
2CVES107_3	Choose the position of centroid for a plane lamina by using experimental method.
2CVES107_4	Interpret forces in the members of truss using experimental and analytical method.
2CVES107_5	Calculate the coefficient of friction of different material surfaces.

List of Experiments

Exp. No.	Title of Experiments
1	To verify law of polygon of forces using force table.
2	To verify lami's theorem using force table.
3	To verify law of moments by Bell crank lever.
4	To calculate support reactions of beam.
5	To compute centroid of plain lamina.
6	To calculate coefficient of friction of different material surfaces.
7	To find out support reactions of a beam by graphical method.
8	To calculate forces in member of truss with their nature.


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Text Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Mechanics	S. Ramamrutham	Dhanpat Rai Publishing Company (P). Ltd	9 th	2010
02	Engineering Mechanics	R.S. Khurmi	S. Chand	Revised	2006
03	Engineering Mechanics	R. K. Bansal and Sanjay Bansal	Laxmi Publications Pvt. Ltd.	6 th	2013
04	Engineering Mechanics	K. L. Kumar	Tata McGraw Hill Education	4 th	2012
05	Engineering Mechanics	S. B. Junnarkar	Charotar Publications	16 th	2011
06	Engineering Mechanics	S.S. Bhavikatti	New Age International Pvt. Ltd.	4 th	2012

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Mechanics	Irving H. Shames	Prentice Hall of India, New Delhi	5 th	2011
02	Vector Mechanics for Engineers Vol.-I and II	F. P. Beer and E. R. Johnson	Tata McGraw Hill Education	6 th	2011
03	Engineering Mechanics: Statics & Dynamics	Ferdinand Singer	Harper and Row Publications	9 th	2009
04	Fundamentals of Engineering Mechanics	S. Rajasekaran	Vikas Publishing House Pvt. Ltd.	3 rd	2005
05	Mechanics of Materials	Dr. B. C. Punmia	Laxmi Publications Pvt. Ltd.	Reprint	2010



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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVES108, Engineering Graphics and CAD Laboratory
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/4
Credits	2
Evaluation Scheme: ISE	50

Course Outcomes (COs): Project

Upon successful completion of the project, the student will be able to:

2CVES108_1	Prepare drawing of Points, lines, Planes using Auto Cad.
2CVES108_2	Plot projection of solids.
2CVES108_3	Produce the orthographic projection.
2CVES108_4	Plot the isometric projection.
2CVES108_5	Prepare sectional view of solids.

Course Contents:

Unit No.	Title	Hrs
Unit 1	Introduction to AutoCAD Introduction & Review of Previous knowledge Capability of AutoCAD Starting AutoCAD Various Visualization commands Documentation Quick tour Creating and Accessing documentation Layout and plotting Concept of hardware & software	06
Unit 2	Getting started (Principle & Concept) Starting AutoCAD. AutoCAD & interface Setting new drawing. Accessing command Opening & saving existing file & function keys etc.	04
Unit 3	Creating objects (coordinate system) Co-ordinates system and their type. Drawing line objects. Drawing curve objects and solid filled areas.	04
Unit 4	Editing methods and controlling drawing display Working with named objects Editing objects using the object property tool bar and various method. Zooming & Panning drawing, redrawing screen, regenerating the drawing.	06

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Unit 5	Basic dimensioning geometric dimensioning & tolerancing. Adding text to drawing Need for Dimensioning. Detailed discussion on Dimensioning and tolerance method in AutoCAD Editing method. Adding text with various engineering symbols.	04
Unit 6	Perspective drawing	04

List of Experiments

Exp. No.	Title of Experiments
1	Computer aided drafting of Curves.
2	Computer aided drafting of solids upto hexagonal base shape and cylindrical/ Conical shape inclined to the reference planes.
3	Computer aided drafting of orthographic vies of simple 3d objects. (04)
4	Computer aided drafting of Isometric view.
5	Plotting of perspective views of given solids or small 3D objects.

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Drawing	N D Batt & V M Panchal	Charotor Publication House, Bombay	50 th	2010
02	Engineering Drawing	Dhananjay A Jhole	Tata Mc-Graw Hill	5 th	2011
03	Fundamentals of Engineering Drawing	Warren. J. Luzadder	Prentice-Hall of India.	11 th	1999
04	Engineering Drawing	P S Gill	Katson books	9 th	2012

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Drawing & Graphics	K. Venugopal	New Age Publication	5 th	2012
02	Engineering Drawing	M. B. Shaha and B. C. Rana	Pearson Education	2 nd	2012
03	ABC's of Auto CAD	George Omura	BPB Publication.	-	-
04	Engineering graphic with Auto CAD 2002,	Bethune	Pearson Publication	-	-


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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVES109, Design Thinking Laboratory
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	1/0/2
Credits	2
Evaluation Scheme: ISE	50


Course Outcomes (COs): Project

Upon successful completion of the project, the student will be able to:

2CVES109_1	Apply the design thinking techniques to empathize the customer through arranging survey and/or interview.
2CVES109_2	Identify and Formulate the solution for real world problem using design thinking technique.
2CVES109_3	Create and Exhibit Prototype, for defined problem using design thinking approach.
2CVES109_4	Test developed prototype for defined problem to meet user's requirements.
2CVES109_5	Adapt ethical practices and professional skills to provide a reliable solution for defined real world problem through participating in team activities.

Unit No.	Content	Hrs.
Unit 1	Introduction to Design Thinking, Design Thinking Process	02
Unit 2	Empathize Phase: Empathy and Ethics, User Perspective, Activities – Empathy Map, Planning, Persona building.	02
Unit 3	Customer Journey Mapping, Observation of stakeholders, Defining and Conceptualization of problem	02
Unit 4	Ideation, Activities – 5 Whys & 1 How, Story boarding, Brainstorming.	02
Unit 5	Prototype – Types, Mindsets, Tools.	02
Unit 6	Testing – Scenario, Methods, Refinements & Recommendations.	02

Expt. No	Title of the Experiment
1	Identification and Selection of Problems
2	Designing of Empathy Map
3	Customer Survey and Analysis
4	Persona Building
5	Customer Journey Map
6	Defining the problem
7	Poster Presentation
8	Ideation
9	Prototype Building
10	Testing


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Text Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Understanding Design Thinking, Lean, and Agile	Jonny Schneider	O'Reilly	---	2017
02	Introduction to Design Thinking	S. Salivahanan, S. Suresh Kumar, D. Praveen Sam,	Tata Mc Graw Hill,	---	2019
03	Karmic Design Thinking - A Buddhism-Inspired Method to Help Create Human-Centered Products & Services	Prof. Bala Ramadurai,	Self-Published	--	2020
04	Design: Creation of Artifacts in Society	Prof. Karl Ulrich, U. Penn	University of Pennsylvania	--	2011

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Design for How People Think	John Whalen	O'Reilly	---	2019
02	Change by Design	Tim Brown	HarperCollins	---	2009
03	Creative Confidence: Unleashing the Creative Potential Within Us All	Kelley, D. & Kelley, T	New York: William Collins	---	2014
04	Sprint: How to Solve Big Problems and Test New Ideas in Just Five Days	Jack Knapp and others	Simon & Schuster	---	2009

Other Books/E-material			
Sr. No	Title	Instructor	Publisher
01	NPTEL Course- Design Thinking A Primer	Prof. Ashwin Mahalingam & Prof. Bala Ramadurai	www.nptel.ac.in
02	NPTEL Course- Innovation by Design	Dr. B.K. Chakravarthy	www.nptel.ac.in



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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVHS110A, Badminton
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS110A_1	Improve physical fitness.
2CVHS110A_2	Understand the basic rules and how they can play the game of badminton.
2CVHS110A_3	Provide opportunities for playing modified games to promote student learning
2CVHS110A_4	Develop students' critical thinking skills, problem solving skills, self-management skills, collaboration skills, risk assessment etc.
2CVHS110A_5	Learn various technical motor skills in badminton and how you can move better in the court.
2CVHS110A_6	Acquiring a satisfactory level of knowledge and experience of the sport, to enable students to play by themselves for recreation.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to badminton – Aim – Objectives – Short reference in Badminton history Understand the basic rules and how they should play normal game.	04
Unit 2	Skills - Service, Net shot, Clear, Drop, Smash. Skills - Service Forehand & Backhand, Net shot, Drive (Presentation and practice to the court)	06
Unit 3	Skills – Clear, Drop, Smash Implementation of singles rules	05
Unit 4	Footwork 1 Footwork 2	05
Unit 5	Implementation of doubles rules. Forehand strokes, Motor skills practice 1	06
Unit 6	Motor skills practice 2 Motor skills practice 3 Motor skills practice 4	04


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Course Details:

Class	F.Y. B. Tech, Sem.-I
Course Code and Course Title	2CVHS110B, Volley Ball
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS110B_1	To send the ball over the net, according to the regulations, to the ground on the opponents ground
2CVHS110B_2	The ball is put into play through the service right back player within the service zone
2CVHS110B_3	The Ball must hit with one hand or one arm and directly send over the net opponent's court.
2CVHS110B_4	To valley the ball over the net before it touches on the ground
2CVHS110B_5	The players use their hands to volley the ball.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction & Understand basic volleyball rules, terminology, and scoring procedures.	04
Unit 2	Demonstrate basic skills associated with volleyball, including passing, setting, serving, attacking (spiking), and blocking.	06
Unit 3	Demonstrate the ability to perform individual offensive and defensive skills and strategies.	05
Unit 4	Demonstrate an understanding of the typical game sequencing: serve, pass, attack, defense, transition, and defense.	05
Unit 5	Understand and apply the knowledge of basic rules of volleyball. Skill Practice	06
Unit 6	Demonstrate proper etiquette and good sportsmanship. And Skill related Practice. Skill Practice	04


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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVHS110C, Kabaddi
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS110C_1	Acquire, analyze and interpret basic skills
2CVHS110C_2	Appraise the rules and regulation.
2CVHS110C_3	Demonstrate and assess various basic skills/techniques and game strategies.
2CVHS110C_4	Develops confidence, concentration and tolerance in players.
2CVHS110C_5	This game also Provides an opportunity for healthy competitions among equal players and help them make friends.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Kabaddi – Aim – Objectives – Short reference in Kabaddi history Understand the basic rules and how they should play normal game.	04
Unit 2	Demonstrate basic skills associated with Kabaddi, including pushing, Bonus, Tackling, attacking, and blocking	06
Unit 3	Demonstrate an understanding of the typical game sequencing: service, Bonus, attack, defense, Raiding and defense.	05
Unit 4	Demonstrate the ability to perform individual offensive and defensive skills and strategies. Stepping Practice.	05
Unit 5	Skill Demo – Stepping, Bonus, Foot touch, Toe touch, Thrust, Squat leg, Kicks & Practice.	06
Unit 6	Skill Practice And Shadow Practice	04


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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVHS110D, Foot Ball
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS110D_1	By applying these principles through active participation, students develop the necessary Skills and knowledge to play football.
2CVHS110D_2	Provides students with opportunities to improve physical fitness acquire knowledge of fitness concepts and practice positive personal and social skills.
2CVHS110D_3	Students will gain an understanding of how a wellness lifestyle affects one's health, fitness and physical performance

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Football – Aim – Objectives – Short reference in Football history Understand the basic rules and how they should play normal game.	04
Unit 2	Introduce students to the basic skills and knowledge associated with football. Understand basic football rules, terminology, and safety concerns.	06
Unit 3	Demonstrate the basic football skills of passing, three point stance, catching, blocking, hand-offs, punting, the carry and kicking & Practice.	05
Unit 4	Demonstrate the ability to perform individual offensive and defensive skills and strategies.	05
Unit 5	Improve personal fitness through participation in yoga, muscular strength, muscular endurance, and flexibility activities & Practice.	06
Unit 6	Successfully participates in skill improvement and offensive game strategies & Practice	04


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Course Details:

Class	F. Y. B. Tech, Sem.-I
Course Code and Course Title	2CVHS110E, Bharatnatyam Classical Dance
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS110E_1	Interpolation of Indian classical dance forms & basic types of Bharatnatyam.
2CVHS110E_2	Subdivide bharatnatyam in terms of Nrutt, Nrutya & Nattya.
2CVHS110E_3	Show the perform base on signal & combine hand posture in terms of Ganesh Vandana & Mahalaxmi Ashtak

Course Contents:

Unit No.	Title	Hrs.
Unit 1	History of Bharatnatyam Dance style & information about all Indian classical dance forms.	01
Unit 2	Basic types of Bharatnatyam :- Tatty Advu, Natty advu, Vishru advu, Kuddit Mett advu, Mett advu, tatti kuddit mett advu & Tirmanam (small). Study of Navras Abhinay. Singal Hand posture , Footwork , Shirobhed(head movement),	10
Unit 3	Combine Hand posture. Meaning of Guruvandna, Ganesh, mahalaxmi shlok. Definition of Nrutt, Nrutya & Nattya.	06
Unit 4	Practical session of Ganesh vandna Shlok in classical music.	06
Unit 5	Practice Sessions. & Presentation Of Ganesh vandna	07
Unit 6	History of Bharatnatyam Dance style & information about all Indian classical dance forms.	01



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Course Details:

Class	F.Y. B. Tech, Sem.-I
Course Code and Course Title	2CVHS110F, Harmonium Classical Music
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS110F_1	Outline in History Harmonium & different Raags.
2CVHS110F_2	Perform on different songs
2CVHS110F_3	Role play the different music by means of harmonium.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	History & Introduction of Harmonium.	02
Unit 2	Harmonium presentation of Raag :- Bhoop raag / Bhimpalash raag.	12
Unit 3	Practice sessions.	03
Unit 4	Practice song notations & Harmonium Dhoon (percussion)	08
Unit 5	Practice sessions & students presentations	05
Unit 6	History & Introduction of Harmonium.	02


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Course Details:

Class	F.Y. B. Tech, Sem.-I
Course Code and Course Title	2CVHS110G, Indian Folk Dance
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS110G_1	Discuss different types in Indian Folk dance.
2CVHS110G_2	Demonstrate Navras Abhinay, Tribal dance, Dhangari & Lavni dance.
2CVHS110G_3	Compose dance on different folk dance style.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Indian Folk dance & its forms.	02
Unit 2	Basic steps of folk dance styles.	03
Unit 3	Importance of expressions (Acting) in dance, Navras Abhinay & its types. (9 type of navras)	03
Unit 4	Tribal dance, & its different styles.	06
Unit 5	Practice sessions.	04
Unit 6	History of Dhangari & Lavni dance. Types of dhangari & lavni dance.	01
Unit 7	Steps (dance composition) of Dhangari & Lavni dance.	07
Unit 8	Practice sessions & Students performance	04


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Course Details:

Class	F.Y. B. Tech, Sem. - I
Course Code and Course Title	2CVHS110H, Karaoke Singing.
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50


Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS110H_1	Understand notation of the songs.
2CVHS110H_2	Perform happy, sad, love devotional, patriotic songs.
2CVHS110H_3	Compose songs in many variations.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Song Notation	04
Unit 2	Happy song / Sad song (classical & semi classical)	08
Unit 3	Love song / Devotional song / Patriotic songs	08
Unit 4	Song composition	05
Unit 5	Practice session & students presentation	05


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Course Details:

Class	F. Y. B. Tech, Sem.- II
Course Code and Course Title	2CVBS111, Applied Mathematics II
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial	3/1
Credits	4
Evaluation Scheme: ISE / MSE / ESE	40 / 30 / 30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVBS111_1	Solve problems on partial derivatives by using fundamental concepts of derivative and apply it to find Jacobian, Maxima and Minima of functions of several variables.
2CVBS111_2	Solve Ordinary Differential Equation by using analytical method and numerical techniques.
2CVBS111_3	Use technique of finite difference and interpolation to compute the value of function for given data.
2CVBS111_4	Apply the concept of Special Functions to evaluate improper integrals.
2CVBS111_5	Evaluate proper and improper type of multiple integrals by using fundamental concepts of integration and apply it to find Area and Mass of a given region.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Partial Differentiation and Its Applications: Function of two or more variables, Partial derivatives, Euler's theorem, Change of variables, Jacobin, Maxima and minima of functions of two variables.	08
Unit 2	Ordinary Differential Equation (First order and First degree): Linear differential equation, Equation reducible to linear differential equation, Exact differential equation, Equation reducible to exact equation.	07
Unit 3	Numerical Solution of Ordinary Differential Equation (First order and First degree): Picard's method, Taylor's series method, Euler's method, modified Euler's method, Runge-kutta method.	06
Unit 4	Finite Differences and Interpolation: Finite differences, Newton's Interpolation formulae, central difference interpolation formulae (stirling formula), interpolation with unequal interval (Lagrange's formula)	06
Unit 5	Special Functions: Gamma function, Properties of Gamma function, Beta function, Properties of Beta function, Relation between Beta and Gamma functions.	07
Unit 6	Multiple Integral and It's Applications: Double Integrals, Triple integral, Change of Order of Integration, Change to polar, Applications to Area and Mass of plane lamina.	08


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Sr. No.	Title of Tutorials
1	Partial Differentiation and homogeneous function
2	Applications of Partial Differentiation
3	Linear and non-differential equation.
4	Exact and non-differential equation
5	Numerical Solution of Ordinary Differential Equation
6	Newton's Interpolation formulae: forward and backward difference formulae
7	Central difference interpolation formulae (stirling formula) and Lagrange's interpolation formula.
8	Special functions

Text Books


Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Higher Engineering Mathematics	Dr. B. S. Grewal	Khanna Publishers	44 th	2018
02	Advanced Engineering Mathematics	N. P. Bali, Manish Goyal	Infinity science press	7 th	2010
03	Advanced Engineering Mathematics	H. K. Das	S. Chand	22 nd	2018
04	Numerical Methods in Engineering & Science	Dr. B. S. Grewal	Khanna Publishers	9 th	2010

Reference Books / Handbooks

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	A textbook of Applied Mathematics	P. N. Wartikar & J. N. Wartikar	Pune Vidyarthi Griha Prakashan	1 st	2008
02	Higher Engineering Mathematics	B. V. Ramana	Tata McGraw Hill Publ.	6 th	2010
03	Advanced Engineering Mathematics	Erwin Kreyszig	Wiley Publishers	10 th	2017
04	Numerical Methods	Dr. P. Kandasamy, Dr. K. Thilagavathy, Dr. K. Gunavathi	S. Chand	1 st	2010



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Course Details:

Class	F. Y. B. Tech, Sem.- II
Course Code and Course Title	2CVBS112, Applied Chemistry
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial	3/0
Credits	3
Evaluation Scheme: ISE / MSE / ESE	40 / 30 / 30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVBS112_1	Apply principles of water testing to identify water quality parameters and methods of water softening using fundamental laws.
2CVBS112_2	Classify fuels and analytical methods to identify their characteristics using basic principles of chemistry.
2CVBS112_3	Select engineering, ceramic materials on the basis of its properties and applications using their chemical composition.
2CVBS112_4	Apply the methods of prevention of corrosion to a given metal considering its types and factors affecting corrosion.
2CVBS112_5	Compute the values of hardness of water and calorific values of fuels using fundamental equations.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Water Technology: Introduction, impurities in natural water, Water Testing: acidity, alkalinity and chlorides, hardness of water (definition, causes and significance), Calculations of total hardness, disadvantages of hard water in domestic and industrial applications. Scales and sludges: Formation in boilers and removal, Treatment of hard water by ion- exchange process, Zeolite process, Desalination of brackish water by Reverse Osmosis.	07
Unit 2	Chemical and Instrumental Techniques: Chemical analysis, its types, Different ways to express concentration of solution. Numerical problems. Standards and its types. p^H-metry: Introduction, pH measurement using glass electrode and applications. Spectrometry: Introduction, Laws of spectrometry (Lamberts and Beer-Lambert's law). Instrumentation and applications of UV-Visible spectrophotometer, Chromatography: Introduction, Principle, instrumentation and applications of gas-liquid chromatography (GLC).	07
Unit 3	Engineering Materials: A) Polymers: Introduction, plastics, thermo-softening and thermosetting plastics, industrially important plastics like phenol-formaldehyde, urea formaldehyde. Conducting polymers, biodegradable polymers (properties and applications), composites, fibre-reinforced plastics (FRP) and glass reinforced plastics (GRP). B) Lubricants: Introduction, classification of lubricants (solid, semisolid and liquid), lubrication and its types, characteristics of lubricants: viscosity, viscosity	07

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	index, flash point, fire point, cloud point and pour point.	
Unit 4	<p>Fuels and Non-conventional Energy Sources: Fuels: Introduction, classification, characteristics of good fuels, comparison between solid, liquid and gaseous fuels, types of calorific value (higher and lower), Bomb calorimeter and Boy's calorimeter. Numericals on Bomb and Boy's calorimeter. Batteries: Introduction, Characteristics of a battery, Rechargeable Li-ion batteries (Diagram, charging-discharging reactions, advantages and applications). Fuel Cells: Introduction, H₂-O₂ Fuel cell (Construction, working and applications), applications of fuel cells.</p>	07
Unit 5	<p>Corrosion & Green Chemistry: Corrosion: Introduction, causes, types, Atmospheric corrosion (oxidation corrosion), Electrochemical corrosion (hydrogen evolution and oxygen absorption mechanism), factors affecting rate of corrosion, Prevention of corrosion by proper design and material selection, hot dipping (galvanizing and tinning), cathodic protection method, electroplating, metal cladding. Green Chemistry: Definition, Twelve principles of green chemistry, Research and industrial applications.</p>	07
Unit 6	<p>Metallic & Ceramic Materials: Alloys: Introduction, alloy definition and classification, purposes of making alloys. Ferrous alloys: Plain carbon steels (mild, medium and high). Nonferrous alloys: Copper alloy (Brass), Nickel alloy (Nichrome), Aluminum alloy (Duralumin and Alnico). Ceramic Materials: Introduction, types of ceramics, types of cement & their applications, Manufacture of Portland Cement by wet process, Composition of Portland Cement & their functions- a) Chemical composition, b) Compound composition, Setting & hardening of Portland Cement.</p>	07

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	A Text Book of Engineering Chemistry	S. S. Dara	S. Chand & Co. Ltd., New Delhi.	11 th	2008
02	A Text book of Engineering Chemistry	Shashi Chawala	Dhanpat Rai Publishing Co. New Delhi.	3 rd	2007
03	A Test Book of Applied Chemistry	Ziyauddin D. Sande, Vijayalaxmi M. Vairat, Pratapsingh V. Gaikwad	Wiley Publications	1 st	2018


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Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Chemistry	Jain & Jain	Dhanpat Rai Publishing Co., New Delhi.	16 th	2015
02	Industrial Chemistry	B. K. Sharma	Goel publication (P) Ltd.	10 th	1999
03	Fundamentals of Engineering Chemistry	S. K. Singh	New Age International (P) Ltd, New Delhi.	1 st	2009
04	Instrumental Methods of Chemical Analysis	Chatwal and Anand	Himalaya Publishing House, Mumbai.	5 th	2005
05	Engineering Chemistry	Wiley India	Wiley India Pvt. Ltd., New Delhi.	1 st	2012



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Course Details:

Class	F. Y. B. Tech, Sem.- II
Course Code and Course Title	2CVPC113, Fundamentals of Civil Engineering
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial	4/0
Credits	4
Evaluation Scheme: ISE / MSE / ESE	40 / 30 / 30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVPC113_1	Develop the components of residential building for a given site condition with the help of building planning rules and regulations
2CVPC113_2	Apply the knowledge of surveying techniques considering the IS code
2CVPC113_3	Discuss the principles of planning with building bye laws and property transaction
2CVPC113_4	Describe aspects of civil engineering field & masonry construction for residential building considering client's requirements
2CVPC113_5	Make use of Transportation, Environmental and Irrigation Engineering in civil engineering sector considering national building code


Course Contents:

Unit No.	Title	Hrs
Unit 1	Introduction to Civil Engineering: Branches & applications of civil engineering, Role of civil engineer, Types of structure, types of loads, Elements & functions of sub structure, types of soil and rocks, concept of bearing capacity, types of foundations, Elements of super-structures and their functions, Concept of Green Building	10
Unit 2	Surveying Principles & Classification of surveys, Dumpy level, Auto Level, Theodolite, Terms used in levelling, levelling instruments, methods of reduction of levels, types of levelling. Contours: Characteristics of contours, use of contour maps. Introduction to EDM and Total station.	06
Unit 3	Building Materials & formwork: Applications and properties of the following building materials: Bricks, Steel, Cement, Aggregate, Plastic, Aluminium, Water, M.S., S.S., FRP sheets, Gypsum, wood, glass, stone, tiles, bitumen, ceramic Formwork: Requirement, economy and material	12
Unit 4	Masonry: Stone masonry - Random Rubble, Uncoursed Rubble, Coursed Rubble and Ashlar Masonry. Brickwork and Brick Bonds - English, Flemish, and Rat trap bond (one- brick thick). Composite masonry, various types of composite masonry walls Arches: Technical terms in arches, types of arches. Lintel: Necessity, types of lintels Basic requirements of a building as a whole:	11

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Unit 5	Introduction to Transportation, Environmental and Irrigation Engineering Components of rigid & flexible pavement, Cross section of road in cutting & filling. Components of railway track(Broad Gauge) Green Building – Introduction & rating system, Smart cities, Sustainability, Carbon footprint. Components of water supply scheme (flow diagram). Introduction to Gravity and Earthen Dam.	08
Unit 6	Building Planning: Procedure of Building Permission, significance of commencement, plinth completion or occupancy certificate, orientation of building, National Building code, types of building, Principles of planning, building bye laws, Line plan of residential building	09

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Surveying	N. Basak	Tata Mac Graw Hill Publications	1 st	2016
02	Engineering Hydrology	K Subramanya	Mac Graw Hill Publications	4 th	2013
03	Basic Civil Engineering	G. K. Hiraskar	Dhanpatrai Publications	1 st	2008
04	Basic Civil Engineering	S. S. Bhavikatti	New Age International Publications	2 nd	2003
05	Surveying Vol. I, II, II	B. C. Punmia	Laxmi Publications	2 nd	2001

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Introduction to Environmental Engineering	Mackenzie Davis and David Cornwell	McGraw Hill Education;	6 th	2020
02	The A To Z of Practical Building Construction and its Management	Sandeep Mantri	Satya Prakashan	1 st	2010
03	Engineering Surveying	Schofield W.	Taylor and francies	6 th	2007
04	Advanced Surveying: Total Station, GIS and Remote Sensing	Satheesh Gopi, R. Sathikumar, N. Madhu	Pearson Education India	1 st	2006
05	Surveying	A. Bannister, S. Raymond, R. Baker	Pearson	7 th	2002


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Course Details:

Class	F. Y. B. Tech, Sem.- II
Course Code and Course Title	2CVES114, Basic Electrical Engineering
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial	2/0
Credits	2
Evaluation Scheme: ISE / MSE / ESE	40 / 30 / 30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVES114_1	Explain basic terminologies related to DC, AC and magnetic circuits to relate the operations of electrical devices using electrical laws.
2CVES114_2	Relate the concepts of AC fundamentals to single-phase and three-phase AC circuits to describe the generation of AC with phasor representation.
2CVES114_3	Demonstrate wiring circuits and earthing systems using circuit diagrams on the basis of different applications & workspaces.
2CVES114_4	Describe the working principle of AC and DC Machines using electromagnetic laws with constructional features & types for various applications.
2CVES114_5	Apply conceptual understanding of AC& DC parameters to solve electrical circuits and provide a solution

Course Contents:

Unit No.	Title	Hrs
Unit 1	DC Circuits Definitions: EMF, Current, Electrical Work, Power, Energy, Ohm's Law, Kirchhoff's Laws, Factors affecting resistance, Analysis of DC Circuits using KCL & KVL [Numerical treatment].	05
Unit 2	Magnetic Circuits Magnetic circuits & definitions, Comparison between Electric and Magnetic circuit, Magnetic Leakage and Fringing, Magnetization (B-H) curve.	04
Unit 3	Fundamentals of AC Circuits Generation of alternating voltage and current, concept of RMS value, Average value, phasor representation, AC circuits- pure R, L, C, and series R-L-C circuits [Numerical Treatment]. Generation of three-phase AC voltage, Advantages of the three-phase system over single-phase system	05
Unit 4	Earthing and Wiring Circuits Concept of earthing, necessity of earthing, plate and pipe earthing, HRC fuse, Simple wiring, Staircase wiring, Godown wiring. [Theoretical treatment only].	04
Unit 5	Single Phase Transformer Working principle of a Transformer, Construction, Core type, and Shell type transformer, EMF Equation, Transformation ratio & applications.	05
Unit 6	Electrical Machines D.C.Motor: Working principle of a DC motor, Construction, Type, and applications.	05

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<p>Single phase AC motor: Double Field Revolving Theory, Working principle of Split phase I.M, applications.</p> <p>Universal Motor: Construction, working principle, applications. [Theoretical treatment only].</p>	
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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Basic Electrical Engineering	V. K. Mehta Rohit Mehta	S. Chand Publications, New Delhi	5 th	2016
02	A Textbook of Electrical Technology	B L Theraja & A K Theraja	S. Chand Publications, New Delhi	1 st (Reprint)	2016
03	Basic Electrical Engineering	J. M. Kharade, M. D. Patil, D. B. Kanase	Wiley India	1 st	2018
04	Basic Electrical Engineering	I.J. Nagrath D. P. Kothari	Tata McGraw Hill	3 rd	2013

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Electrical Engineering Concepts and Applications	PV Prasad & S. Shivanaraju	CENGAGE Learning	1 st	2012
02	Fundamentals of Electrical Engineering	Bharati Dwivedi, Anurag Tripathi	Wiley	2 nd	2014
03	Electrical Engineering Fundamental	Vincent Del Toro	Pearson Publication	2 nd	2003
04	Fundamentals of Electrical Engineering	Ashfaq Husain	DhanpatRai & co.	3 rd	2008
05	Basic Electrical & Electronics Engineering	S. K. Bhattacharya	Pearson Publication	1 st	2012



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Course Details:

Class	F. Y. B. Tech, Sem.- II
Course Code and Course Title	2CVBS115, Applied Chemistry Laboratory
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVBS115_1	Determine the hardness acidity, alkalinity, chloride content using appropriate methods of titration for given sample of water.
2CVBS115_2	Estimate rate of corrosion in acidic and alkaline medium by depreciation of weight.
2CVBS115_3	Use pH meter to determine pH value of given solution and validate the findings with suitable optical method (photo-colorimeter) and graphical methods.
2CVBS115_4	Analyze coal sample, lubricants and aqueous solutions to get the percentage compositions using appropriate methods.
2CVBS115_5	Communicate effectively about laboratory work both orally and writing.

List of Experiments


Exp.No.	Title of Experiments
1	Determination of acidity of water sample. (Neutralization Titration)
2	Determination of alkalinity of water sample. (Acid- Base Titration).
3	Determination of chloride content of water by Mohr's method. (Precipitation Titration).
4	Determination of total hardness of water sample by EDTA method.
5	Determination of moisture, volatile and ash content in a given coal sample. (Proximate analysis)
6	Preparation of Urea-formaldehyde resin.
7	Determination of viscosity of lubricating oil.
8	Estimation of zinc in brass solution (Displacement Titration)
9	Estimation of copper in brass solution (Displacement Titration)
10	Determination of rate of corrosion of aluminium in acidic and basic medium
11	Determination of pH of sample solution by pH meter
12	Determination of calorific value of fuel using Bomb calorimeter.
13	Demonstration of Photo-colorimeter.

Minimum 8 experiments should be performed from the list out of which two experiments should be on instrumental methods.


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	A Text Book of Engineering Chemistry	S. S. Dara	S. Chand & Co. Ltd., New Delhi.	11 th	2008
02	A Text Book of Engineering Chemistry	Shashi Chawala	Dhanpat Rai Publishing Co. New Delhi.	3 rd	2007


Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Materials Science and Engineering –	V. Raghvan	PHI Learning	5 th	2006
02	Engineering Chemistry	Jain & Jain	Dhanpat Rai Publishing Co., New Delhi.	15 th	2010
03	Industrial Chemistry	B. K. Sharma	Goel publication (P) Ltd.	10 th	1999



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Course Details:

Class	F. Y. B. Tech, Sem.- II
Course Code and Course Title	2CVPC116, Fundamental of Civil Engineering Laboratory
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs): Project

Upon successful completion of the project, the student will be able to:

2CVPC116_1	Draw building components of residential by using AutoCAD considering requirement of owner
2CVPC116_2	Calculate reduced levels of different points by levelling.
2CVPC116_3	Calculate linear angular and area measurement by Total Station.
2CVPC116_4	Understand the documents required for municipal submission drawing

List of Experiments


Exp. No.	Title of Experiments
1	Determination of reduced levels for different points by HI & Rise and fall method.
2	Angular measurement by using theodolite.
3	Visit to construction site and visit report.
4	Collection of the various documents required for municipal sanctioning of plan
5	Draw various building components- Staircase & openings
6	Draw a line plan of residential building by applying principles of planning.
7	Study of total station and Linear & Angular measurement.
8	Area measurement by using total station.
9	Traversing by total station.




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Text Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Building Drawing: With An Integrated Approach To Built Environment	S. Y. Patki, M G Shah, C M Kale	McGraw Hill India	6 th	2021
02	Basic Civil Engineering	G. K. Hiraskar	Dhanpatrai Publications	1 st	2008
03	Surveying	N. Basak	Tata Mac Graw Hill, Publications	1 st	2008
04	Basic Civil Engineering	S. S. Bhavikatti	New Age International Publications	2 nd	2003
05	Surveying Vol. I, II, II	B. C. Punmia	Laxmi Publications	2 nd	2001

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Introduction to Environmental Engineering	Mackenzie Davis and David Cornwell	McGraw Hill Education	6 th	2020
02	The A To Z of Practical Building Construction and its Management	Sandeep Mantri	Satya Prakashan	1 st	2010
03	Engineering Surveying	Schofield W.	Taylor and francies	6 th	2007
04	Advanced Surveying: Total Station, GIS and Remote Sensing	Satheesh Gopi, R. Sathikumar, N. Madhu	Pearson Education India	1 st	2006
05	Surveying	A.Bannister, S.Raymond, R.Baker	Pearson	7 th	2002
06	Civil Engineering Handbook	P.N.Khanna	Engineer's Publishers	17 th	1999



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Course Details:

Class	F. Y. B. Tech, Sem. - II
Course Code and Course Title	2CVES117, Basic Electrical Engineering Laboratory
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs): Project

Upon successful completion of the project, the student will be able to:

2CVES117_1	Identify electrical components, equipment, Lamps and different illumination schemes using electrical apparatus & symbols to handle it properly for experimentation.
2CVES117_2	Measure electrical parameters with appropriate measuring instruments on the basis of ratings and type of connections.
2CVES117_3	Demonstrate the circuit laws, perform testing on electric machine to find the solutions with the help of various instruments for domestic and industrial applications.
2CVES117_4	Correlate and comment the observations and results of experiment with different laws to provide solution for given system.
2CVES117_5	Practice safety precautions in day to day life & communicate effectively with ethics about laboratory work both orally and in writing.

List of Experiments

Exp. No.	Title of Experiments
1	Study of electrical components, equipment's, & measuring instruments.
2	Safety Precautions and earthing Test
3	Kirchhoff's Voltage and Kirchhoff's current Law
4	B-H curve for magnetic material
5	RLC Series Circuit
6	Demonstration of different Wiring Circuits
7	Lamps and Illumination Schemes
8	Effect of Temperature on Resistance
9	Load Test on Single Phase Transformer
10	Load Test on DC Shunt Motor.



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Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Basic Electrical Engineering	V. K. Mehta Rohit Mehta	S. Chand Publications, New Delhi	5 th	2016
02	A Textbook of Electrical Technology	B L Theraja & A K Theraja	S. Chand Publications, New Delhi	1 st (Reprint)	2016
03	Basic Electrical Engineering	J. M. Kharade, M. D. Patil, D. B. Kanase	Wiley India	1 st	2018
04	Basic Electrical Engineering	LJ. Nagrath D. P. Kothari	Tata McGraw Hill	3 rd	2013

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Electrical Engineering Concepts and Applications	PV Prasad & S. Shivanaraju	CENGAGE Learning	1 st	2012
02	Fundamentals of Electrical Engineering	Bharati Dwivedi, Anurag Tripathi	Wiley	2 nd	2014
03	Electrical Engineering Fundamental	Vincent Del Toro	Pearson Publication	2 nd	2003
04	Fundamentals of Electrical Engineering	Ashfaq Husain	DhanpatRai& co.	3 rd	2008
05	Basic Electrical & Electronics Engineering	S. K. Bhattacharya	Pearson Publication	1 st	2012



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Course Details:

Class	F. Y. B. Tech, Sem.- II
Course Code and Course Title	2CVES118, Programming for Problem Solving Laboratory
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	1/0/2
Credits	2
Evaluation Scheme: ISE/ESE (POE)	50 / 50

Course Outcomes (COs): Project

Upon successful completion of the project, the student will be able to:

2CVES118_1	Prepare an algorithm and draw a flowchart to accurately solve various mathematical problems by using structured approach.
2CVES118_2	Apply the fundamental concepts like data types, operators, looping constructs to solve mathematical problems by using the decision and looping controls.
2CVES118_3	Develop a C program to demonstrate the modular approach by using the concept of function, structure and pointer.
2CVES118_4	Demonstrate a solution for various mathematical problems by using the fundamental concepts of C.
2CVES118_5	Write, Compile and debug C program for various problem statements by using structured approach.

Course Contents:

Unit No.	Title	Hrs
Unit 1	Introduction to Information Technology Computer, hardware, software, computer generation, I/O devices-CPU-Memory devices-processors-keyboard-printers. Operating systems- introduction, types of OS, Functions of OS.	02
Unit 2	Problem Solving The meaning of algorithms, Flowcharts, Pseudo codes, Writing algorithms and drawing flowcharts for simple exercises, C Program development environment. Importance of 'C' Language, History, Structure of 'C' Program, Sample 'C' Program.	02
Unit 3	C Fundamentals Constants, variables and data types. Operators and expressions, Managing input / output operations, Control statements-Decision making, Case control & Looping Constructs.	03
Unit 4	Array The meaning of an array, one dimensional and two dimensional arrays, declaration and initialization of arrays, reading , writing and manipulation of above types of arrays, multidimensional arrays.	02
Unit 5	Functions Need of user defined functions, elements of User defined functions, defining functions, return values and their types, function calls, function declaration, methods of parameter passing, Scope rule of functions	02

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Unit 6	Structure & Pointers Need of Structure, Defining a structure, declaring and accessing structure variables, structure initialization, copying and comparing structure variables, structures and functions, Unions. Understanding pointers, accessing the address space of a variable, declaring and initialization pointer variables, accessing a variable through its pointer	03
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List of Experiments


Exp. No.	Title of Experiments
1	Write an algorithm and draw flowchart for given problem statement.
2	Program using different data types and operators in C.
3	Program using if ,if else and if else if construct
4	program to demonstrate looping constructs(while, for loop, do while)
5	Program using nested loop (for loop, while loop).
6	program to demonstrate one dimensional array
7	program to demonstrate two dimensional array
8	Implement a program to demonstrate user defined functions.
9	program to demonstrate concept of structures in c.
10	program to demonstrate pointers and pointer arithmetic in c.

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Computer Practice	Sheela Kumar	Anuradha Publishers	-	2003
02	Programming And Problem Solving Using C Language	ISR D Group	McGraw-Hill Publications	-	2012
03	Let Us C	Yashwant Kanetkar	BPB	3 rd	2011


Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	The 'C' Programming Language	D. M. Ritchie	Pearson	2 nd	1998
02	The Complete Reference C	Herbert Schildt	McGraw-Hill Publications	4 th	2000
03	Test your C Skills	Yashwant Kanetkar	BPB Publications	5 th	2013


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Course Details:

Class	F.Y. B. Tech, Sem.-II
Course Code and Course Title	2CVHS119A, Table -Tennis
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS119A_1	The students define table tennis game.
2CVHS119A_2	Willingly participates in Table Tennis as a component of an active lifestyle.
2CVHS119A_3	The students explain foot- work in forehand and backhand spin.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction & Understand basic Table Tennis rules, terminology, safety concerns, and scoring procedures.	04
Unit 2	Demonstrate proper court etiquette and good sportsmanship.	06
Unit 3	Demonstrate basic skills associated with table tennis including forehand, backhand, spins, grips & serves.	05
Unit 4	Demonstrate Exposition and Applying forehand and backhand straight strike.	05
Unit 5	Assess current personal fitness levels & Practice.	06
Unit 6	Use a variety of stroke placements to keep opponent moving during a table tennis match. Practice.	04

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Course Details:

Class	F.Y. B. Tech, Sem.-II
Course Code and Course Title	2CVHS119B, Kho-Kho
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS119B_1	Helps In Motor Development.
2CVHS119B_2	It helps in social and mental development of the student
2CVHS119B_3	Kho-Kho helps the student to off depression, anxiety, stress and, increase self-esteem.
2CVHS119B_4	It develops team spirit and leadership skill.
2CVHS119B_5	It improves physical fitness.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Kho-Kho – Aim – Objectives – Short reference in Kho-Kho history Understand the basic rules and how they should play normal game.	04
Unit 2	Demonstrate basic skills associated with Kho-Kho, including Fundamental Skills. Chasing Skills- a) Giving Kho b) Taking Direction c) Sudden Change d) Tapping	06
Unit 3	Demonstrate basic skills associated with Kho-Kho, including Fundamental Skills. Chasing Skills-e) Turning Round the Post f) Trapping g) Diving h) Fake Kho i) Late kho & Practice	05
Unit 4	Demonstrate basic skills associated with Kho-Kho, including Running Skills a) Position on the court b) Avoiding Trapping c) Positioning near post d) Dodging	05
Unit 5	Demonstrate basic skills associated with Kho-Kho, including Running Skills e) Front Dodge f) Back Dodge c) Round the post dodge & Practice	06
Unit 6	Kho-Kho Skills Practice & Matches.	04


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Course Details:

Class	F. Y. B. Tech, Sem.-II
Course Code and Course Title	2CVHS119C, Basket Ball
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS119C_1	Introduce students to the basic skills and knowledge associated with basketball.
2CVHS119C_2	By applying these principles through active participation, students develop the necessary skills and knowledge to play basketball
2CVHS119C_3	Provides students with opportunities to improve physical fitness, acquire knowledge of fitness concepts and practice positive personal and social skills
2CVHS119C_4	Students will gain an understanding of how a wellness lifestyle affects one's health, fitness and physical performance.


Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction & Understand basic basketball rules, terminology, and safety concerns.	04
Unit 2	Demonstrate the six basic basketball skills of a) Running b) Jumping c) Passing d) catching e) Dribbling and f) Shooting.	06
Unit 3	Demonstrate the ability to perform individual offensive and defensive skills and strategies.	05
Unit 4	Understand and apply the knowledge of basic rules of basketball. Skills Practice.	05
Unit 5	Demonstrate proper etiquette and good sportsmanship. Successfully participates in skill improvement and offensive game strategies.	06
Unit 6	Identify and apply injury prevention principles related to aerobic activities. Practice & Matches.	04


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Course Details:

Class	F.Y. B. Tech, Sem.-II
Course Code and Course Title	2CVHS119D, Hand Ball
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS119D_1	The student has a basic knowledge of the team values of sports games
2CVHS119D_2	Acquainting with the characteristics and trends in the development of the discipline.


Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction & Understand basic Handball rules, terminology, and safety concerns.	04
Unit 2	Health and safety rules. Rules for obtaining credit for the course, Reminder of the history, methodology and basic rules of the game, Exercises to improve passing, grips and throws. The game. Reminder of the refereeing rules.	06
Unit 3	Improving the technique of passing and grips in a team setting. Individual ways of freeing oneself from the opponent and the organization of positional attacks with their use	05
Unit 4	Exercises improving feints and individual defense technique, Everyone's defense system. Principles of individual defense & Practice.	05
Unit 5	Improving the technique of passing and grips in a team setting. Individual ways of freeing oneself from the opponent and the organization of positional attacks with their use. The game & Practice.	06
Unit 6	Identify and apply injury prevention principles related to aerobic activities. Practice & Matches	04


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Course Details:

Class	F.Y. B. Tech, Sem.-II
Course Code and Course Title	2CVHS119E, Katthak Classical Dance
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS119E_1	Explain Importance of katthak with respect to Indian culture.
2CVHS119E_2	Demonstrate Guruvandana, Tatkar.
2CVHS119E_3	Compose Katthak dance with consideration of classical & semi classical music.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Classical dance katthak & its importance.	01
Unit 2	Guruvandana & Tatkaar. (teen taal)	03
Unit 3	Chakri & Hast-sanchalan	03
Unit 4	Tode. (Tigida-tigdig-thai)	03
Unit 5	Practice sessions.	02
Unit 6	Paran & Tihaei	05
Unit 7	Classical dance on Song	05
Unit 8	Practice sessions.	08

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Course Details:

Class	F. Y. B. Tech, Sem.-II
Course Code and Course Title	2CVHS119F, Tabla Classical instruments
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS119F_1	Discover History of table wadan.
2CVHS119F_2	Demonstration of different Taal in table wadan.
2CVHS119F_3	Develop notation on new music with help of table wadan.

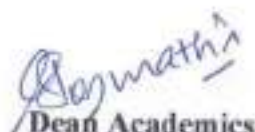
Course Contents:

Unit No.	Title	Hrs.
Unit 1	History & Introduction to Tabla Wadan.	01
Unit 2	Tabla presentation of Taal. Tritaal/ Dadra/ Zaptaal/ Kerwa/ Bhajni	05
Unit 3	Practice sessions.	06
Unit 4	Practice with notation, & Set one song with tabla	08
Unit 5	Practice sessions & students presentations.	10

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Course Details:

Class	F.Y. B. Tech, Sem.-II
Course Code and Course Title	2CVHS119G, Western Dance
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS119G_1	Describe History of Western dance & basic of western dance.
2CVHS119G_2	Organize western dance individually as well as group with help of western music.
2CVHS119G_3	Compose western dance on songs.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	History of Western dance style & information about western dance.	02
Unit 2	Basic types of western dance: - worm-up, Hand- legs movements.	04
Unit 3	Teaching Basic style (focus on dance / music / movements, how to control body, emotion/feeling of music/ dance.)	06
Unit 4	Training western dance with music (original dance form of western, free style dance)	08
Unit 5	Dance composition.	05
Unit 6	Practice session , & Students Presentation	05

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Course Details:

Class	F.Y. B. Tech, Sem.-II
Course Code and Course Title	2CVHS119H, Yoga
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS119H_1	Discuss importance of Yoga with respect to different forms of exercise.
2CVHS119H_2	Perform Different styles of Yoga.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction , importance of yoga, Basic exercise, sun salutation, shavasana taught yogic & excises types	06
Unit 2	Omkar & sleeping position seats (aasn yogic excise type)to teach omkar in a scientific way, to teach mercatasan , makrasan, setubandhan,	04
Unit 3	Opposite sleeping position. Shalabhasan, chakras an, Bhungasan, Makrasan. Pranayam,- Anulom-Vilom,,Bhasarika, Sheetkari, Bhramari, shitali pranayam. Rapid respiration(jalad shwasan)	05
Unit 4	Practice sessions	05
Unit 5	Seats in the sitting position:- padmasan, Wajrasan, Wakrasan, Ardh-machindrasana, Urshtrasan.	04
Unit 6	Seats in Fine Position. (Dand stithi):- Ekpaad vruckrashasan, Veerasan, Patangasan, Trikonasan.	06

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CIVIL ENGINEERING

NEP 170 CREDITS

S. Y. B. Tech. Structure

SEM III

Course Details:

Class	S.Y. B. Tech, Sem.-III
Course Code and Course Title	2CVBS201, Differential Equations and Calculus
Prerequisite/s	2CVBS101, 2CVBS105
Teaching Scheme: Lecture/Tutorial /Practical	02/01
Credits	03
Evaluation Scheme: ISE /MSE / ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVBS201_1	Solve the Linear Differential Equation on Cantilever, Strut and Beam by using analytical method.
2CVBS201_2	Calculate the Area and Volume of given surface by using concept of Vector Calculus.
2CVBS201_3	Construct the Fourier Series of a given functions by using Euler's Formulae.
2CVBS201_4	Make use of partial differential equations to solve Heat and Wave Equation of boundary value problems.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Linear Differential Equations and Its Application Definitions, Complete solution, Operator D, Rules for finding Complementary function, Inverse operator, Rules for finding the Particular integral, Applications of Linear Differential Equations with constant coefficients Cantilever, Strut, Beam.	07
Unit 2	Vector Calculus Introduction, Scalar and vector point functions - vector operator del, Del applied to scalar point functions - gradient, directional derivative, Del applied to vector point functions - Divergence and curl, Line integral, Green's theorem in the plane	06
Unit 3	Fourier Series Introduction, Euler's Formulae, Conditions for a Fourier expansion, Functions having points of discontinuity, Change of interval, Expansion of odd or even periodic functions, Half range series	07
Unit 4	Partial Differential Equations and its Application Introduction, Partial differential equations with separation of variables, Boundary value problems, vibrations of string, One dimensional heat equation.	06


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Sr. No.	Title of Tutorials (13 Hours)
1	Linear Differential Equations.
2	Applications of Linear Differential Equations.
3	Vector Calculus - I (Gradient, directional derivative, Divergence and curl)
4	Vector Calculus – II (Line integral, Green’s theorem in the plane)
5	Fourier Series – I (Full Range Series)
6	Fourier Series – II (Half Range Series)
7	Partial Differential Equations.
8	Applications of Partial Differential Equations

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Higher Engineering Mathematics	Dr. B. S. Grewal	Khanna Publication	44 th	2017
02	Higher Engineering Mathematics.	H. K. Das	S. Chand and company ltd.,	1 st	2011
03	Advanced Engineering Mathematics	Erwin Kreyszig	John Wiley & Sons, Inc.	10 th	2017
04	Engineering Mathematics Vol. I	ITL Education Solution Limited	Cengage Learning	1 st	2015

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Higher Engineering Mathematics.	B.V. Ramana	Tata McGraw Hill Education Pvt., Ltd.	1 st	2007
02	Advanced Engineering Mathematics.	Potter Merle C.	Oxford University Press,	3 rd	2005
03	A text book of Applied Mathematics Vol. I and Vol. II	P. N. Wartikar J. N. Wartikar	Pune Vidyarthi Griha Prakashan, Pune	9 th	Reprint 2010
04	Advanced Engineering Mathematics.	O’Neil Peter V	Cengage Learning India Pvt. Ltd.	1 st	2012


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Course Details:

Class	S.Y. B. Tech, Sem.-III		
Course Code and Course Title	2CVPC202, Structural Mechanics		
Prerequisite/s	2CVPC103		
Teaching Scheme: Lecture/Tutorial /Practical	03/00/02		
Credits	04		
Evaluation Scheme	T	ISE / MSE / ESE	40/30/30
	P	ISE	50

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVPC202_1	Identify various types of stress and strain in various structural elements by using Hooks law.
2CVPC202_2	Draw shear force and bending moment diagrams for beam supports and various loading conditions with the help of different equilibrium condition.
2CVPC202_3	Calculate stresses and deformation of hollow shaft using torsional equation.
2CVPC202_4	Calculate shear stresses and bending stresses for different sections by using flexural formula and shear stress formula.
2CVPC202_5	Calculate critical load for long columns using Eulers theory.
2CVPC202_6	Compute tensile, compressive, bending, shear strength, hardness and shear centre for different loading conditions by using different instruments.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Stress and Strain Introduction to Elasticity, Plasticity, Brittleness and Strength of materials. Types of stresses and strains, stress strain diagrams, Hooke's law, Behavior of composite sections, Stress distribution in the compound bar and bar of varying c/s, temperature stresses. Elastic constants of isotropic materials.	06
Unit 2	Bending moment and shear force in beams Introduction, Relationship between loading, shear force and bending moment, Shear force and bending moment equations, SFD and BMD with salient values for cantilever beams, simply supported beams and overhanging beams considering point loads, UDL, UVL and Couple, calculate reactions and loadings from SFD and BMD (Reverse Method)	07
Unit 3	Torsion Stresses, strains and deformation in determinate and indeterminate shafts of hollow and solid sections of homogenous and composite materials subjected to torque, concept of torsion on beam and slab.	06


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Unit 4	Bending Stresses in Beams Theory of pure bending, Curvature of a beam, Assumptions, flexure formula, Moment of resistance of cross section, Bending stress distribution diagrams for symmetrical and unsymmetrical sections.	07
Unit 5	Shear stresses in Beams Shear Stresses in Beams of various commonly used sections such as rectangular, triangular, T, circular and I section, Concept of Shear Centre.	06
Unit 6	Elastic stability of columns: Introduction – Short and long columns, Euler’s theory on columns, Effective length slenderness ration, radius of gyration, buckling load, Assumptions, derivations of Euler’s Buckling load for different end conditions, Limitations of Euler’s theory, Rankine’s formula and problems.	07

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Strength of Materials	Subramanyam	Oxford University Press	2 nd	2011
02	Text book of Mechanics of Materials	M.N. Shesha Prakash, G.S.Suresh,	PHI, Learning Pvt.Ltd., New Delhi	4 th	2011
03	Strength of Materials	Ramamrutham	Dhanapath Rai Publishers, New Delhi.	6 th	2011
04	Strength of Materials	Bhavikatti S. S.	Vikas Publishers, New Delhi.	3 rd	2009
05	Strength of Materials	Punmia B.C.,Ashok Jain,Arun Jain	Lakshmi Publications,New Delhi.	3 rd	2011

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Fundamentals of Solid Mechanics	Gambhir. M.L.	PHI Learning Private Limited., New Delhi	1 st	2009
02	Mechanics of Materials	Gere and Timoshenko	CBS Publishers & Distributors Pvt. Ltd. Old Delhi	2 nd	2004
03	Strength of Material	Timoshenko, S. & Young, D. H,	McGraw Hill Book Company Publication	4 th	2006
04	Mechanics of Material	Beer and Johnston	Mc Graw Hill publication	3 rd	2004



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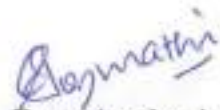

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05	Mechanics of Structures, Vol-I	S.B. Jumarkar and Dr. H.J. Shah	Charotar Publishing house	6 th	2005
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List of Experiments	
Expt. No.	Title of Experiment
1.	Tension test on mild steel and Tor steel
2.	Compressive strength test on timber
3.	Compressive strength and water absorption test on bricks.
4.	Brinell and Rockwell hardness test on different metals
5.	Impact test on different metals.
6.	Bending test on timber
7.	Shear test on different bars
8.	Shear center test for channel section
9.	Assignments: One assignment per unit.



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Course Details:

Class		S.Y. B. Tech, Sem.-III	
Course Code and Course Title		2CVPC203, Building Design and Drawing	
Prerequisite/s		2CVPC107	
Teaching Scheme: Lecture/Tutorial /Practical		03/00/02	
Credits		04	
Evaluation Scheme	T	ISE / MSE / ESE	40/30/30
	P	ISE / ESE	50/50

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVPC203_1	Make use of air conditioning, building finishes, acoustics, plumbing and electrification phenomenon in residential building considering codal provision of IS :3362-1977
2CVPC203_2	Develop the components of residential building for a given site condition with the help of building planning rules and regulations.
2CVPC203_3	Draw the residential building plan for given requirement using principles of planning and building Bye laws.
2CVPC203_4	Draw the municipal and working drawing of residential building by using AutoCAD with the reference of National Building Code.
2CVPC203_5	Prepare the site visit report of residential building with the help of submission and working drawing.
2CVPC203_6	Describe the various types of roof structures and materials commonly used in construction sector as per building Bye laws.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Staircase & Openings: Stairs: Technical terms, requirements of a good stair, uses, types, Materials for construction. Ramps, lifts and escalator. Design of stairs (Dog Legged, quarter turn and Open Well). Doors - Classification, Teak wood Paneled Door, Flush Door, Aluminum Glazed Doors, Steel Doors, fixtures and fastening. Windows - Classification, Teakwood Glazed Windows, Aluminum, Glazed Windows, Steel Windows, UPVC Windows, fixtures and fastening.	07
Unit 2	Planning of Residential Building-I Procedure of Building Permission Understanding of municipal drawings. and working drawing Planning of Residential Building: Bungalows, Row Bungalows, and Twin Bungalows	06
Unit 3	Planning of Residential Building-II Hostels, apartments, Farmhouses, cottages	06


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Unit 4	Plumbing, Electrification & Fire resistance in building: Plumbing: Plumbing system, Materials used for plumbing work. Various types of traps, Fittings, Chambers, Septic Tank, and Concept of Plumbing & Drainage plan. Electrification: Types of wiring and materials, Requirements & Location of various points. Concept of Earthing. Fire resistance in building: Fire resistant construction and fire safety requirements for buildings	06
Unit 5	Building Finishes, Acoustics, Ventilation, Air conditioning and Thermal insulation Paints: Different types and application methods. Plastering, Pointing and various techniques. Wall cladding, skirting, dado work with various materials. POP, Gypsum plaster, need of curtains, Tile flooring, door fixtures, plywood boards, aluminum windows & partitions, fabrication work (M.S. & S. S.), Railing- Glass, S.S., M.S. Acoustics: Conditions for good acoustics Ventilation Definition and necessity of Ventilation, various systems. Air conditioning: - Necessity, Classification, Systems & Its various Components Thermal insulation: Materials and Methods.	10
Unit 6	Roofs and Roof coverings Terms used, types of roofs, pitched roofs and their types, Steel Trusses types and their suitability. Roof covering materials and their selection Concept of proflex (truss less) roof and their selection.	04

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Building Construction	S. P. Bindra & S. P. Arora	Dhanpat Rai Publications (P)Ltd	5 th	2005
02	Building Construction	Dr. B. C. Punmia & Ashokkumar Jain	Laxmi Publications (P)Ltd	10 th	2008
03	Civil Engineering Design & Drawing	D. N. Ghose	CBS Publications, Distributors(P)Ltd	2 nd	2010
04	Building Drawing	M. G. Shah, C. M. Kale, S. Y. Patki	Tata McGraw-Hill Publications (P)Ltd	5 th	2011 (Reprint)



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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	SP 7- National Building Code Group 1 to 5		B.I.S. New Delhi	--	--
02	I.S. 962 - 1989 Code for Practice for Architectural and Building Drawings		B.I.S. New Delhi	--	--
03	SP 6 (Part 1 to Part 6) Handbook for structural engineers -Structural steel sections.		B.I.S, New Delhi	-	-
04	Civil Engineering Drawing	V.B.Sikka	S.K.Kataria & Sons	5 th	2008
05	Building Design and Drawing	Y. S. Sane	Allied Book Stall, Pune	-	-
06	Practical Building Construction & its Management.	Sndeeep Mantri	Satya Prakashan	10 th	2011-12

List of Experiments:	
Expt. No.	Title of Experiments
	Note: Prepare all drawings using AutoCAD software
1	Draw the plan of existing residential building by taking measurements on site and prepare a site visit report
2	Draw plan of bungalow
3	Draw plan of twin bungalow
4	Draw plan of Hostel & apartment
5	Design & Draw plan of proposed residential building (G+1)
6	Draw Municipal Submission drawing of proposed residential building
7	Draw working drawing of Foundation / Center Line of designed building
8	Draw working drawing of Furniture layout plan of designed building
9	Draw working drawing of Electrification plan of designed building
10	Draw working drawing of Water supply and drainage plan of designed building


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Course Details:

Class		S.Y. B. Tech, Sem.- III	
Course Code and Course Title		2CVPC204, Surveying	
Prerequisite/s		2CVPC107	
Teaching Scheme: Lecture/Tutorial /Practical		03/00/02	
Credits		04	
Evaluation Scheme	T	ISE / MSE / ESE	40/30/30
	P	ISE / ESE	50/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVPC204_1	Calculate the independent coordinates for the station of multisided traverse by using the provided field observations with the help of Gales traverse table.
2CVPC204_2	Make use of the field data to calculate the ground levels of a given station point by using the trigonometrical levelling method
2CVPC204_3	Experiment with total stations to measure angles, distances, and elevations for various engineering projects.
2CVPC204_4	Calculate the tachometer constant for a given tacheometer by using field observations.
2CVPC204_5	Utilize the TS/DGPS to monitor construction activities, and verify layout, by given design plans and specifications.
2CVPC204_6	Apply RS/GIS and GPS techniques for geospatial analysis of a region by considering spatial modelling, data analysis and buffering.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Levelling Construction, Temporary and Permanent Adjustments of Dumpy Level, Tilting and Auto Level, Types of Levelling, Effect of curvature and refraction, Sensitivity of Bubble Tube. Contouring, Characteristics of Contours, Methods of Plotting contours, Uses of Contour Maps.	07
Unit 2	Theodolite Traverses surveying Types of theodolite, measurement of angles in both planes, Theodolite traversing - Closing error, Relative error of Closure, and Balancing the traverse. Calculation of Latitude and departure, Gales traverse table. Trigonometric levelling.	07
Unit 3	Photogrammetry Introduction to photogrammetry, Types, and applications in the field of civil engineering, Flight planning, Uses and applications of Satellite Photogrammetry.	07
Unit 4	Tacheometry Significance & Systems, Principle, Calculation of tachometer constants, Distance and elevation formula, Stadia method, Substance method and Tangential system. Advanced instrumentation: Classification, measuring principles, Electronic theodolite, EDM, Total Station, DGPS and Drones.	07



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Unit 5	Remote Sensing Physics of Remote Sensing: Sources of Energy, Active and Passive Radiation, Electromagnetic Radiation - Reflectance, Transmission, Absorption, Thermal Emissions, Interaction with Atmosphere, Data Acquisition Platforms, characteristics of different types of platforms - LANDSAT, SPOT, IRS, ERS, INSAT and other platforms.	06
Unit 6	GPS and GIS: Definition and applications, Basics and applications of Geographical Positioning system (GPS), Basics and applications of GIS, Fundamentals of GIS, Software – Standard Packages like Arcview, ArcGIS, AUTOCAD Map, Map Info etc.	05

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Surveying and Levelling	N. N. Basak	Tata Mcgraw Hill, New Delhi	2 nd	2014
02	Surveying Vol. I and II	S. K. Duggal	Tata Mcgraw Hill, New Delhi	4 th	2009
03	Surveying Vol. I, II and III	Dr. B.C. Punmia,	Laxmi Publishers, New Delhi.	-	2004
04	Surveying and Levelling Vol. I and II	T.P Kanetkar and S.V Kulkarni,	Pune Vidhyarthi Gruha. Pune	-	-

Reference Books:


Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Elements of Photogrammetry	Paul R. Wolf,	McGraw Hill Publication New Delhi	2 nd	1984
02	Remote sensing and Geographical Information System	A. M. Chandra and S. K. Ghosh	Alpha Science International Ltd	1 st	2005
03	Advanced Surveying - Total Station, GIS and Remote Sensing	Satheesh Gopi, R. Sathi kumar and N. Madhu	Pearson publication	2 nd	2012
04	Remote Sensing and Geographical Information System	M. Anji Reddy	B. S. Publications	4 th	2014



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Codes:

1. IRC: SP: 19 - Manual for surveying, Investigation and preparation of Road Projects
2. IRC: SP: 54 -Project preparation Manual for Bridges
3. IRC: SP: 42 - Guidelines on Road Drainage
4. IRC: SP: 50 – Guidelines on Urban Drainage
5. IRC: 38 – Design Tables for Horizontal Curves for Highways

Course Contents: At least 8 experiments along with two surveying projects	
Expt. No.	Title of Experiment
1	To calculate reduced levels by various methods of levelling.
2	Measurement of Horizontal angle in the field.
3	To determine reduced levels by trigonometric levelling
4	To determine reduced levels by tachometric surveying
5	To carry out the study of toposheets.
6	Land surveying and mapping by Total Station
7	Land surveying and mapping by DGPS
8	Introduction to Q-GIS Software and its Applications
9	Traverse project (By using Total Station/Differential Global Positioning System)
10	Surveying Projects (Any one) 1. Profile levelling and Road Project (By using Total Station/Differential Global Positioning System) 2. Block Contouring (By using Total Station/Differential Global Positioning System)


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Course Details:

Class	S. Y. B. Tech, Sem.-III
Course Code and Course Title	2CVPC205, Hydrology and Irrigation Engineering
Prerequisite/s	2CVBS107, 2CVBS156
Teaching Scheme: Lecture/Tutorial /Practical	03/00/00
Credits	03
Evaluation Scheme: ISE /MSE / ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVPC205_1	Identify the discharge of catchment area for given time period using the hydrograph methods.
2CVPC205_2	Estimate the flood level of a given site data by using different formulae.
2CVPC205_3	Select the appropriate hydraulic structure for a given site condition with the help of stability condition.
2CVPC205_4	Analyze surface and ground water hydrology parameters for available hydrological data using different formulae.
2CVPC205_5	Select appropriate irrigation methods for given crops patterns by using different parameters like crop-based water requirement and soil conditions.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to hydrology: Hydrological cycle and its components. Brief introduction of government organizations like IMD, CWPRS, MERI, CDO, Hydrology Project Division, NIH, CWC. Precipitation-types and forms, measurement, analysis of Precipitation data, mass rainfall curves, intensity-duration curves, and concept of depth area duration analysis, frequency analysis. Infiltration- factors affecting and measurement methods. Evaporation and Evapotranspiration-factors affecting and measurement methods.	07
Unit 2	Surface Water Hydrology: Runoff- factor affecting, Rainfall runoff relationship. Hydrograph-Component parts of hydrograph, Storm hydrograph, Base flow and Separation of base flow, direct runoff hydrograph, Unit hydrograph, theory, assumptions, limitations and use, S-curve hydrograph, Synthetic unit hydrograph.	08
Unit 3	Stream Gauging: Selection of site, discharge measurement by Area velocity method, slope Area method Floods: Estimation of peak flow - empirical equations, rational method,	06


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	Importance of- Design flood, standard project flood, maximum probable flood, Introduction to flood frequency analysis. QGIS- Introduction to software application in Hydrology (Watershed Delineation)	
Unit 4	Ground water hydrology: Occurrence of ground water Zones of underground water, movement of ground water and its velocity. Specific Yield of Aquifer, Water logging and land drainage, Reclamation of waterlogged Areas, Alkaline and Saline lands reclamation.	07
Unit 5	Minor and Micro Irrigation: Definition and necessity of irrigation, types and methods of irrigation, Crop water requirement: Principal crops and crop seasons, Classes and availability of soil water, Duty, delta, base period and their relationship, factors affecting duty, methods of improving duty, Assessment, and efficiency of irrigation water. Gross command area, cultural command area and command area calculations based on crop water requirement. Depth and frequency of irrigation.	06
Unit 6	Dams And Minor Irrigation: Dam and its classification: Earthen dams and Gravity dams (masonry and concrete) Earthen Dams-Components with function, typical cross section, seepage through embankment and foundation and its control. Methods of construction of earthen dam, types of failure of earthen dam and preventive measures. Gravity Dams-Forces acting on dam, Theoretical and practical profile, typical cross section, drainage gallery, joints in gravity dam, concept of high dam and low dam. Minor Irrigation works - General layout, and main components of Percolation tank, KT Weir and Lift Irrigation	08

Text Books

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Irrigation engineering Vol. I.	S. K. Garg	Khanna Publication, Delhi	2 nd	2012
02	Engineering Hydrology	Dr. K. Subramanya	Tata McGraw Hill, New Delhi	4 th	2017
03	Hydrology	Dr. P Jaya Rami Reddy	Laxmi Publications, New Delhi	3 rd	2016
04	Engineering Hydrology	Dr. H. M. Raghunath	New Age International Publishers	3 rd	2016


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Reference Books / Handbooks					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Hydrology and water resources	R. K. Sharma	Dhanpatrai and sons, New Delhi	4 th	2018
02	Irrigation Theory and Practice	A M Michael.	Vikas Publications House	2 nd	2015
03	Theory and design of irrigation structures Vol. I and II and II	Varshney, Gupta and Gupta	New Chand and Brothers	2 nd	2015
04	Fundamentals of hydrology	Savindar Singh	Pravalika Publishers Allahabad		2015


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Course Details:

Class	S. Y. B. Tech, Sem.-III
Course Code and Course Title	2CVHS206, Environmental Studies
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	02/00/00
Credits	02
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS206_1	Develop the concept of Sustainability, in context of environmental components, using pillars of sustainable development.
2CVHS206_2	Model his role in effective implementation of sustainable activities, in the corporate sector, using EIA and EMS.
2CVHS206_3	Select the greener technologies as a tool to achieve Sustainable development by knowing the impact of contemporary issues like population explosion, climate change.
2CVHS206_4	Model the role of an individual in prevention of pollution using various types of pollutions using root cause of various types of pollutions.
2CVHS206_5	Prepare a technical report highlighting importance of environment in human life by using techniques like survey, case studies, mini project.
2CVHS206_6	Develop the concept of Sustainability, in context of environmental components, using pillars of sustainable development.

Course Contents:

The main objective of the course is to infuse an understanding of the various environmental concepts on scientific basis in the functional area of Engineering and technology. The course will provide a foundation to critically assess the approaches to pollution control, environmental and resource management, sustainable development, cleaner technologies, Environmental Legislation based on an understanding of the fundamental, environmental dimensions. The course will help to explore the modern concept of green industry and the impact of excess human population, globalization, and climate change on the environment.

Unit No.	Title	Hrs.
Unit 1	Introduction to Environment and concept of Sustainable development: Natural and Built Environment, Environmental Education: Definition, Scope, Objectives and importance. Components of the Environment: Atmosphere, Hydrosphere, Lithosphere and Biosphere. Biological Diversity: Introduction, Values of biodiversity, Threats to biodiversity, Conservation of biodiversity. Sustainable development goals, pillars of sustainable development.	5
Unit 2	Energy and Natural Resources Energy Scenario: Future projections of Energy Demand, Utilization of various Energy Sources, Conventional Energy Sources and Non- Conventional Energy	4

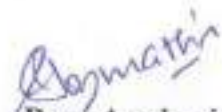

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Reference Books / Handbooks					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Environmental Science: A Global Concern	William Cunningham and Barbara Woodworth Saigo	WCB/McGraw Hill publication	Fifth Edition	1999
02	Peter. H. Raven, Linda. R. Berg, George. B. Johnson	Environment	McGraw Hill publication	Second edition	1998
03	"Adaptive Environmental Management	Catherine Allan & George H. Stanley (Editors),	Springer Publications.	--	2009.
04	Elements of Environmental Science and Engineering	P. Meenakshi	Prentice Hall of India Private Limited, New Delhi	-	2006


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Course Details:

Class	S.Y. B. Tech, Sem.-III
Course Code and Course Title	2CVHS207, Universal Human Values
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	02/00/00
Credits	02
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVHS207_1	Integrate the process of self-exploration to achieve Harmony in the human being's based on Holistic perspective of value education.
2CVHS207_2	Understanding Harmony in human being, family, society and nature /existence, based on methods to fulfill human aspiration.
2CVHS207_3	Apply the human values for maintaining the relationships with oneself and others using the principals of harmony.
2CVHS207_4	Adopt the methods of maintaining harmony with the society, nature, and its existence by utilizing the human order systems.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Value Education Introduction, Need, Purpose and motivation for the course, recapitulation from Universal Human Values-I Self-Exploration-what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations, Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority.	4
Unit 2	Understanding Happiness and Prosperity Understanding Happiness and Prosperity correctly, Prevailing sources of happiness, Prosperity and its implications. Method to fulfil the human aspirations: understanding and living in harmony at various levels.	4
Unit 3	Understanding Harmony in the Human Being - Harmony in Myself Understanding human being as a co-existence of the sentient 'I' and the material 'Body', Understanding the needs of Self ('I') and 'Body' - happiness and physical facility Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I' Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure	6


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	Sanyam and Health.	
Unit 4	Understanding Harmony in the Family - Harmony in Human-Human Relationship Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship Understanding the meaning of Trust; Difference between intention and competence Understanding the meaning of Respect, Difference between respect and differentiation; Peer Pressure the Concerns and its Resolution the other salient values in relationship.	7
Unit 5	Understanding Harmony in the Society Understanding the harmony in society: Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals Human order systems and dimensions	4
Unit 6	Understanding Harmony in the Nature and Existence Understanding the harmony in the Nature, Inter-connectedness and mutual fulfilment among the four orders of nature, recyclability and self-regulation in nature	3

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Understanding Human Being, Nature and Existence Comprehensively	UHV Team	UHV	1 st	2022
2	A Foundation Course in Human Values and Professional Ethics	R. R. Gaur, R Asthana, G P Bagaria	Excel Books	2 nd	2019
3	Teachers' Manual for A Foundation Course in Human Values and Professional Ethics	R. R. Gaur, R Asthana, G P Bagaria	Excel Books	2 nd	2019
4	Human Values	A.N Tripathy	New Age International	2 nd	2006


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Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	A Foundation Course in Human Values and Professional Ethics	R.R. Gaur, R. Sangal, G.P. Bagaria	Excel Books	3 rd	2010
2	Indian Ethos and Modern Management: Amalgam of the Best of the Ideas from the East and the West	B.L. Bajpai	New Royal Book	1 st	2004
3	Small Is Beautiful	E. F. Schumacher.	Hartley & Marks	1 st	1999
4	An Introduction to Ethics	William Lilly	Allied	1 st	1967



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Course Details:

Class	S. Y. B. Tech, Sem.-III
Course Code and Course Title	2CVCC208, Aptitude and Reasoning Part-I
Prerequisite/s	-----
Teaching Scheme: Lecture/Tutorial/Practical	00/00/02
Credits	01
Evaluation Scheme: ISE	50

Course Outcomes (COs) : The students will be able to:

2CVCC208_1	Solve problems based on Vedic Mathematics, Calendar, Average, Age,
2CVCC208_2	Solve problems based on Speed Time distance and equations
2CVCC208_3	Solve problems based on Blood Relations, Directions, Time Rate Work, Pipes and Tanks, Percentage, Profit and Loss
2CVCC208_4	Solve Problems based on Spot the Error and Jumbled Para

Course Contents:

Unit No	Unit Name	Contact Hours
Unit 1	Vedic Mathematics, Calendar	4 Hrs.
Unit 2	Average, Ages	4 Hrs.
Unit 3	Speed Time Distance, Equations	4 Hrs.
Unit 4	Blood Relations, Directions, Time Rate Work, Pipes and Tanks	4 Hrs.
Unit 5	Percentage, Profit and Loss	4 Hrs.
Unit 6	Spot the Error, Jumbled Para	4 Hrs.
	Self-Study Module	6 Hrs.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	R.S. Agarwal (Quantitative aptitude)	R. S. Agarwal	S Chand	3 rd	2019
2	R.S. Agarwal (Verbal & Non-verbal Reasoning)	R. S. Agarwal	S Chand	4 th	2010
3	Wren & Martin (Verbal, Grammar)	P. C. Wren	S Chand	4 th	2017

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	APTIPEDIA (Quantitative, Verbal Aptitude)	Face	Wiley	2 nd	2017
2	Wiley (Quantitative Aptitude)	P. A. Anand	Maestro	4 th	2015
3	Arun Sharma (Verbal Ability)	Meenakshi Upadhyay	McGraw Hill	3 rd	2020


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CIVIL ENGINEERING

NEP 170 CREDITS

S. Y. B. Tech. Structure

SEM IV

Course Details:

Class	S. Y. B. Tech, Sem.-IV	
Course Code and Course Title	2CVPC209, Fluid Mechanics	
Prerequisite/s	2CVPC103	
Teaching Scheme: Lecture/Tutorial/Practical	03/00/02	
Credits	04	
Evaluation Scheme	T	ISE / MSE / ESE
	P	ISE / ESE
		40/30/30
		50/50

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVPC209_1	Solve the basic fluid problems for the given fluid conditions based on the properties of fluids.
2CVPC209_2	Apply the knowledge developed in fluid statics, fluid kinematics and fluid dynamics in fluid flow problems using their basic principles.
2CVPC209_3	Examine the losses in fluid when it is in motion using the principles of continuity, momentum and energy.
2CVPC209_4	Analyze the uniform & non-uniform flow in open channels based on the basic principles developed in open channel flows.
2CVPC209_5	Make use of notches to design the weirs in open channels using the discharge equations.
2CVPC209_6	Compile a report stating the use of different concepts of fluid mechanics in the industry based on the site visit

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Properties of fluids & Fluid Statics: Physical Properties of Fluids, Types of Fluids.	07
Unit 2	Fluid Statics: Types of Pressure, Pressure Measurement Devices, Total Pressure and Centre of Pressure for Plane and Curved Surfaces. Fluid Kinematics: Types of Flows.	06
Unit 3	Fluid Dynamics: Euler's Equation along a Streamline, Bernoulli's Theorem: Assumptions & Limitations, Applications: Venturimeter, Orificemeter. Losses in Pipes: Major and Minor Losses, Concept of Equivalent Pipe, Pipes in Series & Parallel, Two Reservoir Problems, Concept of Siphon	07
Unit 4	Uniform Flow in Open Channel: Introduction, Types of Open Channels and flows, Velocity Distribution, Measurement of Velocity - Chezy's and Manning's Formula, Uniform Flow Computations, Hydraulically Efficient Section, Specific Energy & Specific Force. Notches & Weirs: Types, Discharge Equations	08


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Unit 5	Non-Uniform Flow in Open Channel (GVF & RVF): Gradually Varied Flow (GVF): Classification of Channel Slopes & GVF Profiles, Dynamic Equation of GVF, Direct Step Method of Computation of GVF Profiles.	07
Unit 6	Rapidly Varied Flow (RVF): Hydraulic Jump - Phenomenon, Conjugate Depth Relationship, Uses and Types of Hydraulic Jump, Hydraulic Jump as an Energy Dissipater.	04

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	A text book of Fluid Mechanics	R.K. Rajput	Chand Pub.	9 th	2013
02	Engg. Fluid Mechanics	K.L.Kumar	Eurasia Pub.	7 th	2001
03	Fluid Mechanics	S. Ramamurtham	Dhanpat Rai & sons	-	2009
04	Fluid Mechanics and Hydraulic Machines	R.K.Bansal	Khanna Pub.	10 th	2013

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Fluid Mechanics – Hydraulic & Hydraulic Mechanics	Modi-Seth	Standard Book House, Delhi	10 th	2011
02	Fluid Mechanics	John F. Douglas et.al.	Pearson Education Co., Delhi	-	2002
03	Fluid Mechanics	Streeter, Wylie, Belford	Mc-Graw hill Pub.	7 th	2009
04	Fluid Mechanics	Frank M White	Mc-Graw hill Pub	9 th	2010
05	Fluid Mechanics	H. Rouse	Toppan C. Ltd. Tokyo	-	2010
06	Fluid Mechanics	Garde-Mirajgaonkar	Nemchand Bros., Roorkee	1 st	2011


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List of Experiments (Any 10)

Expt. No.	Title of Experiment
01	Calibration of Measuring Tank and Measurement of Discharge
02	Study of Pressure Measuring Devices
03	Calibration of Venturimeter
04	Calibration of Orificemeter
05	Verification of Bernoulli's Theorem
06	Determination of hydraulic coefficients of orifice
07	Calculation of Reynolds's number for Laminar and Turbulent flow
08	Study of factors affecting friction factor for pipe flow (at least for two different materials and two different diameters)
09	Study of hydraulic jump for different discharges
10	Plotting specific energy curve for different discharges
11	Calibration of Notches
12	Heleshaw's apparatus for streamline flow
13	Report on visit to CWPRS or hydropower generation plant



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Course Details:

Class		S.Y. B. Tech, Sem. - IV	
Course Code and Course Title		2CVPC210, Concrete Technology	
Prerequisite/s		2CVPC107	
Teaching Scheme: Lecture/Tutorial/Practical		03/00/02	
Credits		04	
Evaluation Scheme	T	ISE / MSE / ESE	40/30/30
	P	ISE	50

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVPC210_1	Analyze the use of admixture to achieve the appropriate grade under the various exposure conditions
2CVPC210_2	Determine the different properties for a given grade of cement and aggregates with the help of code provisions.
2CVPC210_3	Examine the properties of fresh concrete for the given grade with the help of code provisions.
2CVPC210_4	Design the concrete mix for the given grade of concrete using available ingredients and IS/ACI code.
2CVPC210_5	Determine the quality and strength of concrete for old buildings by utilizing NDT methods.
2CVPC210_6	Select the type of special concrete for different site conditions based on their properties.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Cement: Portland cement, chemical composition, Hydration, Setting of cement, Structure of hydrate cement, Test on physical properties, Different grades of cement. Admixtures: Types of admixtures, mineral and chemical admixtures.	7
Unit 2	Aggregates: Classification of aggregate, Particle shape & texture, strength & other mechanical properties of aggregate, Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate, Bulking of sand, Deleterious substance in aggregate, Soundness of aggregate, Alkali aggregate reaction, Thermal properties, Sieve analysis, Fineness modulus, Grading curves, Grading of fine & coarse Aggregates, Gap graded aggregate, Maximum aggregate size.	6
Unit 3	Fresh Concrete: Workability, Factors affecting workability, Measurement of workability by different tests, Setting times of concrete, Effect of time and temperature on workability, Segregation & bleeding, Mixing and vibration of concrete, Steps in the manufacture of concrete, Quality of mixing water.	6
Unit 4	Concrete Mix Design Objectives of mix design, Different methods of Mix design, Factors affecting mix proportions, Quality control of concrete, Statistical methods, Acceptance	8


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	criteria. Mix design by IS 10262- 2019, IS 456, Mix design of fly ash concrete by IS 10262, 2019 and Manufactured sand concrete, Mix design by ACI 211.1-91 for high strength concrete.	
Unit 5	Durability of concrete Strength and Durability relationship, the effect of w/c on durability, different exposure conditions as per IS 456 minimum and maximum cement content, Effect of Permeability, Sulphate attack, Methods of controlling sulfate attack. The durability of concrete in seawater. Test on hardened concrete - Flexural strength, Comparison of cube test and cylinder test, Schmidt's rebound hammer, Ultrasonic pulse velocity method.	6
Unit 6	Special concrete Lightweight concrete, No-fines concrete, High density concrete, Self-compacting concrete, Cold weather concreting, Hot weather concreting, Fiber reinforced concrete, ferro-cement concrete, High strength concrete High performance concrete, Manufacturing of ready mix concrete	6

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Concrete Technology	M. S. Shetty	S. Chand & Company Ltd, New Delhi	1 st	2007
02	Concrete Technology	M. L. Gambhir	Tata McGraw-Hill New Delhi	2 nd	2001
03	Concrete Technology	Santakumar A.R.	Oxford University Press.	-	2009
04	Textbook of Concrete Technology	P.D. Kulkarni, R.K. Ghosh	Newage International	3 rd	2007

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Concrete Technology	Neville and Brooks	Pearson Education, New Delhi	3 rd	2003
02	Concrete Technology	Dr. Aminul Islam laskar	Laxmi Publication	1 st	2013
03	IS 456: 2000		-	-	2000
04	IS 10262 - 2015, ACI 211.1-91		-	-	2009



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Course Contents for practical	
Expt. No.	Title of Experiment
01	Determination of fineness of cement by Sieve analysis
02	Determination of the standard consistency of cement.
03	Determination of soundness of cement by Le-Chatelier's apparatus/Auto Clave.
04	Determination of initial and final setting time of cement.
05	Determination of compressive strength of cement.
06	Determination of particle size distribution of fine, coarse, and all in aggregate by a sieve analysis (grading of aggregate and FM).
07	Determination of specific gravity, water absorption of fine and coarse aggregates.
08	Nondestructive test on concrete.
09	Mix Design of Concrete using IS10262- 2009, IS 456 and making cubes of concrete. Tests for compressive strength of various grades of concrete cubes (IS 10262- 2009 and IS 456).
10	Determination of workability of fresh concrete by using a slump cone.
11	Determination of compaction factor for the workability of fresh concrete.


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Course Details:

Class	S.Y. B. Tech, Sem.-IV
Course Code and Course Title	2CVPC211, Structural Analysis
Prerequisite/s	2CVPC202
Teaching Scheme: Lecture/Tutorial/Practical	03/00/00
Credits	03
Evaluation Scheme: ISE /MSE /ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVPC211_1	Determine static and kinematic degree of determinacy using equilibrium equation.
2CVPC211_2	Compute principle stress, strain for different loading conditions with the help analytical and graphical method
2CVPC211_3	Draw Influence line diagram for determinate structure by using Muller-Breslau's principle.
2CVPC211_4	Calculate slope and deflections of determinate beams with the help of different methods.
2CVPC211_5	Compute strain energy stored in material under different loading by using concepts of strain energy.
2CVPC211_6	Compute stresses for different structures under different loading using combined stresses theory.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Structural Systems and Energy Concept Forms of structures, Conditions of equilibrium, Degree of freedom, Linear and Nonlinear structures. One, two, three dimensional structural systems, Determinate and indeterminate structures [Static and Kinematics]. Theorem of minimum potential energy, Law of conservation of energy, Principle of virtual work.	07
Unit 2	Principal stresses and strains Concept of principal planes and principal stresses, normal and shear stresses on an oblique plane, magnitude and orientation of principal stresses and maximum shear stress. Mohr's circle for plane stresses.	06
Unit 3	Influence line diagrams Muller-Breslau's principle, influence line diagram for simple and compound beams. Application of influence line diagram to determinate 2D trusses under moving load.	07
Unit 4	Strain energy Concept, expression of strain energy for axially loaded member under gradual, sudden and impact loads. Strain energy due to self-weight.	06


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Unit 5	Slope and deflection of determinate beams Double integration method and Macaulay's method. Moment area method, Conjugate beam method.	06
Unit 6	Combined direct and bending stresses Combined direct and bending stresses, eccentric load on short columns, kern of a section, eccentricity of load about both axes of section. Chimney subjected to wind pressure, problems on dams and retaining walls.	07

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Strength of Materials	Subramanyam	Oxford University Press	2 nd	2011
02	Text book of Mechanics of Materials	M.N. SheshaPrakash, G.S.Suresh,	PHI, Learning Pvt. Ltd., New Delhi	-	2011
03	Strength of Materials	Ramamrutham	Dhanapath Rai Publishers, New Delhi.	-	2011
04	Strength of Materials	Bhavikatti S. S.	Vikas Publishers, New Delhi.	3 rd	2009
05	Strength of Materials	Punmia B.C., AshokJain, Arun Jain	Lakshmi Publications, New Delhi.	-	2011

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Fundamentals of Solid Mechanics	Gambhir. M.L.	PHI Learning Private Limited., New Delhi	1 st	2009
02	Mechanics of Materials	Ugural. A.C	Wiley India Pvt. Ltd., New Delhi	-	2013
03	Strength of Material	Timoshenko. S.& Young. D. H,	McGraw Hill Book Company Publication	4 th	2006
04	Mechanics of Material	Beer and Johnston	Mc Graw Hill Publication	3 rd	2004
05	Mechanics of Structures, Vol-I	S.B. Jurnarkar and Dr. H.J.Shah	Charotar Publishing House	6 th	2005


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Course Details:

Class	S.Y. B. Tech, Sem.-IV
Course Code and Course Title	2CVPC212, Construction Management and Economics
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	02/00/00
Credits	02
Evaluation Scheme: ISE /MSE /ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVPC212_1	Apply the principles of management for decision making by using the management theories.
2CVPC212_2	Make use of ABC and EOQ technique for optimizing inventory of construction material.
2CVPC212_3	Choose the best feasible solution for a given condition using economic comparison techniques.
2CVPC212_4	Select the better investment/business option for a given project by using various economic comparison methods.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Elements of Management Definitions of management, Principle of management (Henry Fayol), Functions of management, Decision Making: Process, Decision Tree, Management theories Neoclassical theory and Maslow's theory.	06
Unit 2	Inventory Management Objectives, Need for Inventory Control, EOQ Analysis, ABC analysis, Safety Stock, Purchase Procedure, Stores Record. (Introduction to material management software.)	07
Unit 3	Economics: Importance, Time Value of Money, Equivalence Present Worth Method, Equivalent Uniform Annual Cost method (EUAC), Future worth method.	07
Unit 4	Economic Comparison Methods: Linear Break Even Analysis, Net Present Value, Rate of Return, Payback Period Method, Benefit- Cost Ratio	06


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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Management	Stoner	Pearson Education	6 th	2003
02	Operation Research	S. H. Deshpande	Megraw Hill Publishing Ltd.	3 rd	2014
03	Engineering economics and financial accounting	Prasanna Chandra	Tata Mcgraw Hill Publishing Ltd.	4 th	2005
04	Management information system	K. C. and J. P. Laudon	Prentice Hall	4 th	2011

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Management and Engineering Economics	G.A.Taylor	-----	---	---
02	Material Management	Gopal Krishnan, Sdueshan	McGraw Hill Education	1 st	2001


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Course Details:

Class	S. Y. B-Tech Sem.-IV
Course Code and Course Title	2CVSA213, Satellite Geodesy
Prerequisite/s	2CVPC204
Teaching Scheme: Lecture/Tutorial/Practical	02/00/00
Credits	02
Evaluation Scheme: ISE /MSE /ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVSA213_1	Identify the geometry and its relationship with the Earth using different coordinate systems to locate points on Earth.
2CVSA213_2	Choose different coordinate systems used for satellites geodesy under various laws of motion.
2CVSA213_3	Apply satellite geodetic methods to determine the shape, and size of Earth's surface by various coordinate systems.
2CVSA213_4	Make use of the various coordinate system to locate a point on Earth's surface by geodetic applications.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Geodesy Definition, historical background, and importance of geodesy. Geodetic reference systems and datum. Geodetic coordinate systems and transformations. Geodetic Datum and Reference Frames Earth's shape and size. Geoid and its significance. Datum and their evolution. Transformation between datum.	06
Unit 2	Geodetic Measurements and Instruments Basic geodetic measurements (angles, distances, and heights). Introduction to surveying instruments (total stations, theodolites, GNSS receivers, levelling equipment, etc.) Error sources and propagation in geodetic measurements.	07
Unit 3	Satellite Geodesy Global Navigation Satellite Systems (GNSS) - GPS, GLONASS, Galileo, BeiDou, IRNSS etc. Satellite orbit determination. Satellite altimetry and gravimetry. Satellite-based Earth Observation and InSAR (Interferometric Synthetic Aperture Radar).	06
Unit 4	Geodetic Datum and National Coordinate Systems Local, regional, and global geodetic datum. National coordinate systems and map projections.	07


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Geodesy	Wolfgang Torge	Walter de Gruyter	3 rd	2001
02	Geodesy	Guy Bomford	Nabu Press	3 rd	2010

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Geodesy: The Concepts.	Vanicek, P and Krakiwsky, E	Elsevier	2 nd	1986
02	Satellite Geodesy	Seeber, G	Walter de Gruyter.	2 nd	1996
03	Theory of Satellite Geodesy: Applications of Satellites to Geodesy	Kaula, W.M.	Dover Publications.	3 rd	2000
04	Satellite Orbits.	Montenbruck, O, and Gill, E.	Springer	3 rd	2000
05	Geodesy	Tom Herring	Elsevier	2 nd	2009
06	Introduction to Geodesy,	James R. Smith	John wiley and Sons	3 rd	1997



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Course Details:

Class	S. Y. B. Tech, Sem.-IV
Course Code and Course Title	2CVEN214, Air Pollution and Control
Prerequisite/s	2CVHS206
Teaching Scheme: Lecture/Tutorial/Practical	02/00/00
Credits	02
Evaluation Scheme: ISE /MSE /ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVEN214_1	Identify the various types of air pollutants, both indoor and outdoor, on the virtue of their potential effects on human health, animals, plants, and materials.
2CVEN214_2	Demonstrate knowledge of meteorological variables in the dispersion of air pollutants based upon lapse rate, inversions, stability conditions, and wind rose diagrams.
2CVEN214_3	Select the different methods of controlling air pollutants at the source, based upon the type of pollutant by making use of process changes and equipment modification.
2CVEN214_4	Apply various direct and indirect methods to control vehicular pollution on the basis of its detrimental effect caused.
2CVEN214_5	Inspect air quality index values for major cities, based upon the standards and legislation governing air quality, using the concept of ambient air quality monitoring.
2CVEN214_6	Identify the applications of software used in the field of air pollution, as a tool of pollution monitoring, using their capabilities to analyze and manage air quality data.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Air Pollution Scope, significance, Air pollutant classification. Indoor air pollution and noise pollution. Effects on Human Health, Animals, Plants and Materials. Major environmental air pollution episodes.	5
Unit 2	Meteorology Meteorological variables, Lapse Rate, Inversions, Stability conditions, Wind rose diagram, General characteristics of Stack plumes, introduction to meteorological models.	4
Unit 3	At source Control of air pollutants Control at source, Process changes, Equipment Modification, Study of air pollution control equipment's-Settling Chambers, Centrifugal separators, Filters dry and wet scrubber and Electrostatic precipitators.	5
Unit 4	Air Pollution Due to Automobiles Air pollution due to petrol-driven and diesel driven engines, Effects, Direct and Indirect methods of control. Traffic and Environment: Detrimental effect of traffic on the environment- Air	4


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	pollution, Pollutants due to traffic. Measures to reduce air pollution due to traffic.	
Unit 5	Ambient Air Quality Monitoring, Standards and Legislation Air quality networks in Maharashtra. National Air Quality index, State Air Quality Index. Study of AQI of major cities. Air Quality and Emission Standards Legislation and Highlights of Air (prevention and control of pollution) Act, 1981.	4
Unit 6	Applications of Software Introduction of various software used in monitoring air pollution and their capabilities.	4

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Sewage disposal and air pollution engineering	S. K. Garg	Khanna Publishers, New Delhi	33 rd	2015
02	Environmental pollution and control	Dr. H. S. Bhatia	Galgotia Publication	2 nd	2018
03	Air pollution and control	Keshav Kant	Khanna Publishing	1 st	2018
04	Air pollution	Rao M.N. and Rao H. V	Tata McGraw Hill	2 nd	1990

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Environmental Engineering	H. S. Peavy, D. R. Rowe	McGraw Hill	2 nd	1985
02	Chemistry for Environmental Engineering	C. N. Sawyer, P. L. McCarty and G. F. Parkin	Tata McGraw Hill	9 th	1967
03	Air pollution and control	K. V. S. G. Murali Krishna	USP	1 st	2017
04	Air pollution control: A design approach	C David Cooper	Medtech	4 th	2015
05	Mechanics of Structures, Vol-I	S. B. Jumarkar and Dr. H.J. Shah	Charotar Publishing House	6 th	2005


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Course Details:

Class	S.Y. B. Tech, Sem.-IV
Course Code and Course Title	2CVHS215, Psychology
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	02/00/00
Credits	02
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVHS215_1	Identify types of emotions, domains of emotional intelligence and their effects on individual and group behavior for fostering empathy and positive relationships.
2CVHS215_2	Explain human behavior, cognition, and emotions by psychological theories in real-life scenarios and contexts.
2CVHS215_3	Discuss effective time management strategies to overcome time-related challenges.
2CVHS215_4	Interpret psychological factors that contribute procrastination to recognize the situational triggers.
2CVHS215_5	Apply the A-B-C model to manage stress for well-being.
2CVHS215_6	Identify types of emotions, domains of emotional intelligence and their effects on individual and group behavior for fostering empathy and positive relationships.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Psychology Definition of Psychology, Different fields of Psychology, Introduction and Need of psychology	2
Unit 2	Emotional Intelligence (EI) (Part one) Role of Emotions, Types of Emotions, Emotions/ stress and performance	4
Unit 3	Emotional Intelligence (EI) (Part Two) Definition of Emotional Intelligence, Key signs of emotional Intelligence, How EI helps students, Marshmallow Experiment, Five domains of Emotional Intelligence	6
Unit 4	Time Management Definition of Time Management, Need and importance of Time management for an individual, Effective steps/ strategies of Time Management, Obstacles of Time Management	4
Unit 5	Procrastination Definition of Procrastination, Types of Procrastination excuses, How to work on excuses, Why Do People Procrastinate?, Procrastination Cycle, Challenging Your assumptions, techniques to beat Procrastination	5
Unit 6	Stress Management Definition of Stress, A-B-C model for Stress, Identifying Stressful Thoughts and identifying cognitive distortions, Restructuring, Behavioural Coping Strategies	5


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Organizational Behaviour- An Evidence-Based Approach	Fred Luthan	McGraw-Hill/Irwin	12 th	2011
02	Essentials of Organizational Behaviour	Stephen P. Robbins Timothy A. Judge Katherine E. Breward	Pearson	3 rd	2018
03	Essentials of organizational Behaviour	Stephen P. Robbins	Prentice Hall	7 th	2002
04	Understanding and Managing Organizational Behaviour	Jennifer M. George Gareth R. Jones	Pearson	6 th	2012
05	Emotional Intelligence at Work A Professional Guide	Dalip Singh	Response Books A division of Sage Publications	3 rd	2006



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Course Details:

Class	S. Y. B. Tech, Sem.-IV
Course Code and Course Title	2CVHS216, Constitution of India
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	01/00/00
Credits	01
Evaluation Scheme: ISE	25

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVHS216_1	Explain the meaning, important acts and history related to Indian constitution.
2CVHS216_2	Illustrate the features of Indian constitution and interpretation of Preamble.
2CVHS216_3	Interpret fundamental rights and duties of the Indian Citizen to inculcate morality and their social responsibilities.
2CVHS216_4	Identify different laws and regulations based upon Information Acts.
2CVHS216_5	Distinguish the functioning of Indian parliamentary system and legislative system at the centre and state level.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Constitution: Basic Structure Meaning of the constitution law and constitutionalism, Historical perspective of the constitution of India, Government of India Act of 1935 and Indian Independence Act of 1947.	02
Unit 2	Making of Indian Constitution Enforcement of the Constitution, Meaning and importance of Constitution, Making of Indian Constitution – Sources, Salient features of Indian Constitution, Preamble.	02
Unit 3	Fundamental Rights Fundamental Rights – Features and characteristics, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies.	03
Unit 4	Fundamental Duties Directive Principles-Definition and Meaning, 42 nd Constitutional Amendment Act, List and Importance of Fundamental Duties.	02
Unit 5	Regulation to Information Introduction, Right to Information Act.2005, Information Technology Act 2000, Electronic Governance in India, Secure Electronic Records and Digital Signatures, Digital Signature Certificates, Cyber Regulations Appellate Tribunal, Limitations of an Information Technology Act	03
Unit 6	Government of The Union and States President of India – Election and Powers, Prime Minister of India - Election and Powers, Loksabha - Structure, Rajyasabha – Structure, Governor of State, Chief Minister and Council of Ministers in a state.	02


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Indian Polity	M.Laxmikanth	Mc Graw Hill Publications Delhi	7 th	2023
02	The Constitution of India	P.M. Bakshi	Lexis Nexis	19 th	2023
03	Introduction to the Constitution of India	Durga Das Basu	Lexis Nexis	26 th	2022
04	Governance in India	M. Laxmikanth	Mc Graw Hill Publications Delhi	3 rd	2021

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Constitution of India	V.N.Shukla	EBC	14 th	2022
02	The Constitutional Law of India,	J.N. Pandey	Allahabad; Central Law Agency	59 th	2022
03	Constitution of India	V.N.Tripathi	Premier Publishing Company	9 th	2021
04	India's Constitution	M.V.Pylee	S. Chand Publications New Delhi	18 th	2020


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Course Details:

Class	S. Y. B. Tech, Sem.-IV
Course Code and Course Title	2CVPC217, Building Planning & Drawing Laboratory
Prerequisite/s	2CVPC156, 2CVPC253
Teaching Scheme: Lecture/Tutorial/Practical	00/00/02
Credits	01
Evaluation Scheme: ISE / ESE	50 / 50

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVPC217_1	Draw the plan, elevation and section of existing and proposed public building as per National Building code of India
2CVPC217_2	Develop the working drawing of public building considering foundation, furniture, electrification, water supply and drainage as per IS- 962 : 1967
2CVPC217_3	Prepare the site visit report of public building with respect to merits and demerits with the help of submission and working drawing
2CVPC217_4	Create the municipal drawing of a public building by using AutoCAD with the reference of submission drawing

List of Experiments

Expt. No.	Title of Experiment
	Note: Prepare all drawings using AutoCAD software
01	Introduction to prerequisites of planning of public building with reference to national building code (type of public buildings & their specifications)
02	Write site visit report of existing public building (Building units, principles of planning, Building bye laws, dimensions of units etc.)
03	List & Design the units in proposed public building (Area of Building 300-1000 m ²)
04	Draw the plan of proposed public building
05	Draw Municipal Drawing of proposed public building
06	Draw Working drawing of proposed building- Centre line drawing
07	Draw Working drawing of proposed building- Furniture layout
08	Draw Working drawing of proposed building- Electrification layout
09	Draw Working drawing of proposed building- Details of water supply and drainage system


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Course Details:

Class	S. Y. B. Tech, Sem.-IV
Course Code & Course Title	2CVCC218, Aptitude and Reasoning Part- II
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	00/00/02
Credits	01
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVCC218_1	Solve problems based on HCF, LCM, Interest, Clock, Cubes and Puzzles
2CVCC218_2	Solve problems based on Coding and Decoding, Seating Arrangements and Venn diagrams.
2CVCC218_3	Solve problems based on Ratio Proportion, Partnership, Allegation, Divisibility and Number Theory
2CVCC218_4	Demonstrate presentations using concepts delivered on confidence building and time management skills.

Course Contents:

Unit No	Unit Name	Contact Hours
Unit 1	Vedic Mathematics, Calendar	04
Unit 2	Average, Ages	04
Unit 3	Speed Time Distance, Equations	04
Unit 4	Blood Relations, Directions, Time Rate Work, Pipes and Tanks	04
Unit 5	Percentage, Profit and Loss	04
Unit 6	Spot the Error, Jumbled Para	04
	Self-Study Module	06

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	R.S. Agarwal (Quantitative aptitude)	R. S. Agarwal	S Chand	3 rd	2019
2	R.S. Agarwal (Verbal & Non-verbal Reasoning)	R. S. Agarwal	S Chand	4 th	2010
3	Wren & Martin (Verbal, Grammar)	P. C. Wren	S Chand	4 th	2017


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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	APTIPEDIA (Quantitative, Logical, Verbal Aptitude)	Face	Wiley	2 nd	2017
2	Wiley (Quantitative Aptitude)	P. A. Anand	Maestro	4 th	2015
3	Arun Sharma (Verbal Ability)	Meenakshi Upadhyay	McGraw Hill	3 rd	2020


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Course Details:

Class	S. Y. B. Tech, Sem.-IV
Course Code and Course Title	2CVEL219, Product Development Laboratory
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	00/00/02
Credits	01
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVEL219_1	Identify the study area for developing a product based on the need of Innovation.
2CVEL219_2	Survey the market needs for the selected prototype using market survey techniques
2CVEL219_3	Test for various characteristics for the generated prototype using appropriate equipment/tests.
2CVEL219_4	Develop the prototype for the identified area based on the market needs and test results.

List of Experiments

This course is designed to provide students with the necessary skills and knowledge to develop innovative solutions to real-world problems. The course will cover the entire process of innovation, from idea generation to prototype development and testing. Students will learn how to identify market needs, develop new ideas, and create prototypes that meet user needs.

Students in a group of 3 to 5 have to identify the real life problem and need to find a viable solution for the same and have to present it for the evaluation. Every group will be provided with one faculty member as mentor.

Expt. No.	Title of Experiment
01	To study the need of Innovation & Prototype Development in material and technology selection
02	Identify the Prototype Development area.
03	Understanding market needs Idea screening and concept development.
04	Selection of Product development (Software base / Manufactured goods) Idea.
05	Material and technology selection for Product development.
06	Preparing the framework for Innovation and Prototype Development idea.
07	Design and fabrication of a prototype Innovation Product.
08	Testing and evaluation of the prototype Innovation Product.



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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Rapid Prototyping: Projects in 3D Design	Eddie Hanebuth	Digital Quest, Inc	1 st	2015
02	The Innovator's Solution: Creating and Sustaining Successful Growth	Clayton M. Christensen and Michael E. Raynor	The Innovator's Dilemma Series (4 books)	1 st	2013
03	Design thinking – A primer (E-book available on internet)	Ashwin Mahalingam and Bala Ramadurai	IIT, Madras	1 st	2018
04	The Right Way to Select Technology: Get the Real Story on Finding the Best Fit (Digital Reality Checks)	Tony Byrne (Author), Jarrod Gingras (Author)	Kindle Edition	1 st	2017


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Course Details:

Class	S. Y. B. Tech, Sem.-IV
Course Code and Course Title	2CVES220, General Proficiency
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	00/00/02
Credits	01
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of the course, the student should be able to

2CVES220_1	Apply the communication skills for debate/group discussion/letter writing using appropriate English grammar.
2CVES220_2	Identify the key traits in oneself for personality development using appropriate attitude skill and knowledge.
2CVES220_3	Prepare any article using identified adjectives from reading a news article
2CVES220_4	Develop presentation skills on any given topic using presentation tools
2CVES220_5	Create a Curriculum Vitae (CV) for oneself using CV writing techniques
2CVES220_6	Prepare a literature review article for the chosen research topic based on research papers analyzed

List of Experiments (Any 10)

Expt. No.	Title of Experiment
01	Self-awareness: Personality Development
02	Communication Skills & Letter Writing, Email writing
03	News article reading and finding unique words
04	Group Discussion/Debate
05	SWOC Analysis & Decision Making
06	Use of Power Point Presentation tools
07	Use of Microsoft Excel
08	Use of Microsoft Word tools
09	Preparing Curriculum Vitae
10	Searching Research Papers/Journals
11	Writing Literature Review


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**Annasaheb Dange College of Engineering
and Technology, Ashta
An Autonomous Institute**

**T. Y. B. Tech. Structure
(NEP 170 Credits)**

CIVIL ENGINEERING

SEM V

Annasaheb Dange College of Engineering and Technology Ashta
Department of Civil Engineering
 Teaching and Evaluation Scheme



T. Y. B. Tech Semester V

Course Code	Course Name	Teaching Scheme				THEORY						PRACTICAL						GRAND TOTAL
		L	T	P	Credits	ISE		MSE+ ESE		Total	Min	ISE		ESE		Total	Min	
						Max	Min	MSE	ESE			Min	Max	Min	Max			
2ECE3xx	Open Elective-I	3	-	-	3	50	20	-	-	50	20	-	-	-	-	-	-	50
2CVVS301	Design of Steel Structures	3	-	-	3	40	16	30	30	24	100	40	-	-	-	-	-	100
2CVFC302	Geotechnical Engineering	3	-	2	4	40	16	30	30	24	100	40	50	20	50	20	100	200
2CVFC303	Transportation Engineering	3	-	2	4	40	16	30	30	24	100	40	50	20	50	20	100	200
2CVPE3**	Program Elective-I	2	-	-	2	40	16	30	30	24	100	40	-	-	-	-	-	100
2CV**3**	Minor Course - II	3	-	-	3	40	16	30	30	24	100	40	-	-	-	-	-	100
2CVEL311	In Plant Training	-	1	-	1	-	-	-	-	-	-	-	50	20	-	-	50	50
2CVHS312	Entrepreneurship	-	-	2	1	-	-	-	-	-	-	-	50	20	-	-	50	50
2CVCC313	Reasoning and Soft Skill Part - III	-	-	2	1	-	-	-	-	-	-	-	50	20	-	-	50	50
	Total Contact Hours	17	1	8	22													900

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Program Elective - I (Semester V)		
	Course	Domain
2CVPE304	Composite Materials	Structural Engineering
2CVPE305	Investment Planning and Management	Construction Management
2CVPE306	Public Health Engineering	Environment Engineering
2CVPE307	Site Investigation Methods & Practices	Geotechnical and Transportation Engineering
2CVPE308	Remote sensing	Geoinformatics & Geology

Minor Course - II (Semester V)		
	Minor Course- II	Domain
2CVSA309	Global Navigation Satellite Systems	Surveying and Its Applications
2CVEN310	Water and Waste Water Engineering	Environment Engineering


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Sant Dnyaneshwar Shikshan Sanstha's
Annasabeb Dange College of Engineering & Technology, Ashta
(An Autonomous Institute affiliated to Shivaji University, Kolhapur)

Department of Civil Engineering

Open Elective List T.Y. B. Tech Sem. V

Academic Year: 2024-25

Open Electives List T.Y. B. Tech Sem. V

Sr. No.	Course Code	Course Category	Course Name
1	2ILOE351	Health Care Management	Economics of Health and Education
2	2ILOE352	Business Marketing	Business to Business Marketing (B2B)
3	2ILOE353	Intellectual Property Rights	Patent Law for Engineers and Scientists
4	2ILOE354		Economics of Innovation
5	2ILOE355	Business Laws	E-Business
6	2ILOE356	Finance and Accounting	Management Accounting
7	2ILOE357	Banking and Insurance	Economics of Banking and Finance Markets
8	2ILOE358	Investment Management	Quantitative Investment Management
9	2ILOE359	Human Resource Management	Human Resource Development
10	2ILOE360	Business Management	Advanced Business Decision Support Systems
11	2ILOE361	Language	Introduction to Japanese Language and Culture - II
12	2ILOE362		German - I
13	2ILOE363	Retail and Channel Management	Operations and Supply Chain Management


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**Annasaheb Dange College of Engineering
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**T. Y. B. Tech. Curriculum
(NEP 170 Credits)**

CIVIL ENGINEERING

SEM V- VI

Course Details:

Class	T. Y. B. Tech. Sem.-V
Course Code and Course Title	2CVVS301, Design of Steel Structures
Prerequisites	2CVPC202, 1CVPC211
Teaching Scheme: Lecture/Tutorial	03/ 00
Credits	03
Evaluation Scheme: ISE /MSE / ESE	40/30/30

Course Outcomes (COs):


Upon successful completion of this course, the student will be able to:

2CVVS301_1	Discuss fundamentals of design of steel member and failure modes of steel structures by different methods.
2CVVS301_2	Calculate the various parameters of axially and eccentrically loaded welded and bolted connections by using Limit state method.
2CVVS301_3	Design components of steel truss members as tension and compression members analytically by using Limit state method.
2CVVS301_4	Examine steel column, built up column and column bases for different loading conditions as per IS code provision.
2CVVS301_5	Analyze and Design laterally supported & unsupported beams, gantry girder conditions as per IS code provision.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Design philosophy Introduction to Design of steel structures, Design Philosophy, comparison of LSM & WSM, advantages and disadvantages of steel structures, types of steel structures, grades of structural steel, various rolled steel sections, loads and load combinations partial safety factors for load and materials, load calculation for roof trusses. Connection Types of bolts & welds, analysis, and Design of axially and eccentrically loaded bolted and welded connections (subjected to bending and torsion).	06
Unit 2	Tension Members: Common sections, Net area, modes of failure, load carrying capacity. Design of axially loaded tension members, Design of end connections (Bolted and welded)	06
Unit 3	Compression Members as Struts Common sections, economical sections, effective length, slenderness ratio, modes of failure, classification of cross section, behavior of compression member, load carrying capacity, Design of compression members. Design of column subjected to axial and eccentric loading, Lacing and battening of column.	07
Unit 4	Column Bases Design of slab bases & gusseted base subjected to axial and eccentric load and design of concrete pedestal.	07
Unit 5	Beams Types of sections, behavior of beam in flexure, plastic analysis of beam, design	06


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	of laterally supported, unsupported beams and built-up beam using flange plates, curtailment of flange plates, check for deflection, shear, web buckling & web crippling.	
Unit 6	Gantry girder Forces acting on gantry girder, commonly used sections, design of gantry girder as laterally unsupported beam, connection details. Introduction to plate girder and design concept, Introduction to castellated beam, special types of girders, Introduction to Pre-engineered Buildings structures.	07

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Design of Steel Structures	S. K. Duggal	Tata McGraw Hill	9 th	2012
02	Design of steel structure by Limit State Method as per IS: 800- 2007	Bhavikatti S. S	I K International Publishing House, New Delhi	4 th	2015
03	Design of Steel Structures.	K.S. Sairam,	Pearson	1 st	2010
04	Limit State Design in Structural Steel	Dr. M. R. Shiyekar.	PHI publications	2 nd	2016
05	Design of Steel Structures	Dr. N. Subramanian	Oxford	9 th	2012

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Design of Steel Structures	Edwin H. Gaylord, Charles N. Gaylord James, Stallmeyer	Mc-Graw-Hill	3 rd	2010
02	Design of Steel Structures	Dr. V.L.Shah	Stures publications	4 th	2015
03	Design of Steel Structures	Purmia, A. K. Jain and Arun Kumar Jain,	Laxmi Publication	2 nd	2011
04	Design of Steel Structures	Dayaratnam,	Wheeler Publications, New Delhi	2 nd	1998

Codes:

1. IS 800-2007, Indian Standard Code
2. IS 875 Part I, II, III, Indian Standard Code
3. IS Handbook I (Steel table)

Note:

It is necessary to have knowledge of the IS Code and Steel Table for the Design of Steel Structures. Use of IS 800:2007 codes and Steel table is allowed in the examination.



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Course Details:

Class	T. Y. B. Tech. Sem.-V		
Course Code and Course Title	2CVPC302, Geotechnical Engineering		
Prerequisites	2CVES203		
Teaching Scheme: Lecture/Tutorial/Practical	03/00/02		
Credits	04		
Evaluation Scheme	T	ISE / MSE / ESE	40/30/30
	P	ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVPC302_1	Illustrate the various phase diagrams and derive phase relationship of the soil by using index and engineering properties of soil.
2CVPC302_2	Compute the vertical stresses in soil mass due to various loading conditions by Boussinesq and Westergaard's theory.
2CVPC302_3	Differentiate the concept of permeability & seepage of various drainage condition in soil mass using laboratory methods.
2CVPC302_4	Compare the process of compaction and consolidation in soil for various drainage condition by using field and laboratory methods.
2CVPC302_5	Determine the shear strength & bearing capacity of soil under different drainage/loading condition by various methods.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Properties of Soil: Introduction to Soil Mechanics, formation of soil & soil structure, three phase soil system, weight volume relationships, detail index properties of soil-methods of determination and its significance, particle size analysis, I.S classification of soil, Atterbergs consistency limits, field identification of soils.	06
Unit 2	Permeability and Seepage: Permeability- Darcy's law, Factors affecting permeability, Determination of permeability by constant head and falling head method as per IS-2720, Permeability of layered soils. Seepage- Seepage forces, Flow net construction and practical applications, Concept of effective neutral & total stress in soil mass. Quick sand condition. Piping phenomenon.	06
Unit 3	Compaction and Consolidation: Compaction:- phenomenon. Factors affecting compaction, Dry density and moisture content relationship (MDD & OMC). Zero air voids line. Effect of compaction on soil structure, Standard Proctor test and Modified Proctor test as per IS - 2720. Field compaction equipment and methods, Field control of compaction. Concept of soil stabilization Consolidation:- Spring analogy, Terzaghi's theory of one dimensional consolidation, Lab consolidation test; cc, cv, mv and av Determination of coefficient of consolidation-square root of time fitting method and logarithm of time fitting method. normally consolidated and over consolidated soils,	07
Unit 4	Stress Distribution in Soil: Boussinesq theory-point load, uniformly loaded circular area, pressure distribution diagram on a horizontal and vertical plane, pressure bulb,	07


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	Westergaard's theory (Concept), equivalent point load method, Newmark Influence chart.	
Unit 5	Shear Strength: Concept of shear strength, Coulomb's theory and failure envelope, Principal stress, stress analysis, representation of stresses on Mohr's circle for different types of soil etc. Application of shear stress parameters in the field Unconsolidated undrained, consolidated untrained and consolidated drained (CU, UU, CD), type shear strength test. Concept of Earth Pressure for different pressure conditions	06
Unit 6	Bearing Capacity Evaluation: Definitions, Types of foundation, Shallow foundation and Deep foundation, Modes of failure, Terzaghi's bearing capacity theory with assumptions and limitations, I.S. Code method of bearing capacity evaluation, Effect of various factors on bearing capacity Concept for site Exploration, general & detailed, method for site exploration	07

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Soil Mechanics and Foundation Engineering	Dr. K. R. Arora	Standard Publishers and Distributors	12 th	2021
02	Soil Mechanics and Foundations	BC Punmia	Laxmi Publications Pvt Ltd	16 th	2021
03	Soil Mechanics and Foundation engineering	VNS Murthy	Saikripa Technical Consultants Bangalore	13 th	2018
04	Geotechnical Engineering	SK Gulhati	Tata McGraw Hill Delhi	3 rd	2013
05	Soil Mechanics and Foundations	Muni Budhu	Wiley India Pvt Ltd	4 th	2016


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Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Soil Mechanics and Foundation engineering	Hasmukh P. Oza, Gautam H. Oza	Charotar Publishing House Pvt. Ltd.	3rd	2016
02	Soil Mechanics and Foundation engineering	P.N. Modi	Standard Book House	5th	2019
03	Soil mechanics practice	Terzaghi and Peak	John Willey and Sons, New- York	3rd	2010
04	Foundation Analysis and Design	JE Bowles	McGraw Hill International Edition	9th	2011
05	Foundation Design and Construction	MJ Tomlinson	ELBS	9th	2017
06	Design Aids in Soil Mechanics and Foundation Engineering	S.R. Kaniraj	TMH New Delhi	8th	2017

Course Contents:
At least 8 experiments:

Expt. No.	Title of Experiment
1	Determination of water content by oven drying.
2	Determination of Specific gravity by pycnometer/density bottle.
3	Determination of Particle size distribution-Dry Mechanical sieve analysis
4	Determination of consistency limits (LL & PL) and its use in soil classification.
5	Determination of Field density test by Core Cutter Method and Sand Replacement Method
6	Determination of coefficient of permeability by constant head method & variable head method/ falling head method.
7	Determination of compaction by Standard proctor compaction test
8	Calculation of $C-\phi$ value of various soil samples by direct shear test
9	Determination of index properties of soil by digital soil testing equipment's.
10	1. Demonstration of Triaxial shear test 2. Demonstration of Unconfined Compression Test 3. Demonstration of One-dimensional consolidation test


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Course Details:

Class		T. Y. B. Tech. Sem.-V	
Course Code and Course Title		2CVPC303, Transportation Engineering	
Prerequisites		2CVPC204	
Teaching Scheme: Lecture/Tutorial/Laboratory		03/00/02	
Credits		04	
Evaluation Scheme	T	ISE / MSE / ESE	40/30/30
	P	ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVPC303_1	Utilize the aspects of highway planning for design of the highways using geometric elements.
2CVPC303_2	Select the appropriate method for highway construction and drainage based on the tests of subgrade, aggregates and bitumen.
2CVPC303_3	Apply the various techniques for traffic management of highways using statistical analysis of traffic data.
2CVPC303_4	Determine the discharge for designing of bridge and tunnel based on the standard specifications of bridges and tunnel.
2CVPC303_5	Make use of the component parts for the design of railway tracks using the geometric elements.
2CVPC303_6	Design the runway length for an airport based on the various parameters and requirements.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Highway Developments and its construction: Various modes of transportation, characteristics and suitability, Development plans, various organizations involved in highway development. Materials – Stone aggregates, soil, cement, bitumen properties and their testing. Construction methods for various types of flexible and rigid pavements. Drainage, repairs and maintenance.	05
Unit 2	Geometric Design of Highways: Cross-sectional elements, sight distance, reaction time, analysis of safe sight distance, and analysis of overtaking sight distance, intersection sight distance, Horizontal, vertical and transition curves, super elevation, widening, requirements as per IRC, Basic concepts and methods of flexible and rigid pavement design.	08
Unit 3	Traffic Engineering: Traffic studies on flow and speed, peak hour factor, accident study, statistical analysis of traffic data; Microscopic and macroscopic parameters of traffic flow, fundamental relationships; Traffic signs; Signal design by Webster's method; Types of intersections, Introduction to Traffic Safety.	07
Unit 4	Bridge Engineering Classification of bridges, selection of site, factor considered for design of bridge, forces acting on super structure. Design considerations, aesthetics of bridge design Tunnel Engineering Introduction, Classification of tunnels: tunneling in hard rock and soft material, tunnel lining, safety measures, ventilation, lighting and drainage in tunneling.	05


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Unit 5	Railway Engineering: History, Indian Railways – strengths and weaknesses, Permanent Way – components, types, functions, Rails: Coning of wheels and tilting of rails Geometric Design: Alignment, Gradients, Horizontal and transition curves, super elevation design, Points and crossings, track junctions, track resistances, tractive effort, and modern trends in railways.	08
Unit 6	Airport Engineering: Importance of air transportation, airport planning: terminal components, surveys and drawings required; airport layout: imaginary surfaces and zoning requirements; Concept of airport runway length, calculations and corrections; use of wind rose diagram.	06

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	A Course in Highway Engineering	Bindra S. P.	Dhanpat Rai Publications	5 th	2012
02	Highway Engineering	Khanna S. K., Justo C. E. G., Veeraragavan A	Nem Chand & Sons	10 th	2018
03	A Textbook of Railway Engineering	Arora S. P. and Saxena S. C.	Dhanpat Rai Publications Pvt. Ltd.	7 th	2006
04	Airport Planning & Design	Khanna and Arora	Nemchand Bros, Roorkee	6 th	2012
05	Tunnel engineering	S. C. Saxena,	Dhanpatrai & Sons, New Delhi	2 nd	2018
06	Bridge Engineering	Pannuswamy	Advent Books	2 nd	2016

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Traffic Engineering and Transport Planning	Kadiyalai, L. R.	Khanna publishers	8 th	2013
02	Highway Engineering	Wright, Paul H. and Dixon	John Wily & Sons	7 th	2003
03	Railway Track Engineering	Mundrey J. S..	Tata McGraw Hill	4 th	2009
04	Planning and Design of Airports	R. Horonjeff and F.X. Mckelvey	McGraw Hill	6 th	2018
05	Bridge Engineering	Raina	S. Chand	1 st	2017



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Useful Links:

1. <https://nptel.ac.in/courses/105/101/105101087/>
2. <https://nptel.ac.in/courses/105/101/105101008/>
3. <https://nptel.ac.in/courses/105/105/105105107/>


Codes:

1. IRC: 37 (2017) – Tentative Guidelines for the design of flexible pavements
2. IRC: SP: 72 (2015) - Guidelines For The Design Of Flexible Pavements For Low-Volume Rural Roads
3. IRC: SP: 58 - Guidelines for the Design of Plain Jointed Rigid Pavements for Highways

Transportation Engineering Laboratory	
Course Contents:	
Ex. No.	Title of Experiment
Tests on subgrade:	
1	California Bearing Ratio test
Tests on aggregates:	
2	Los Angeles Abrasion test
3	Specific Gravity test
Tests on bitumen: (Any 5)	
4	Bitumen Penetration test
5	Softening Point test
6	Flash and fire point of bitumen
7	Ductility test of bitumen
8	Viscosity test of bitumen
9	Stripping test of bitumen
10	Marshall Stability test
Case Studies:	
11	High speed railways
12	Bridge Construction
13	Traffic black spot identification and remedies
Industrial/Site Visit:	
14	Visit to railway station/Bridge/airport/tunnel/construction of road (flexible/rigid)



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Course Details:

Class	T. Y. B. Tech. Sem.-V
Course Code and Course Title	2CVPE304, Composite Materials
Prerequisites	2CVPC202
Teaching Scheme: Lecture/Tutorial	02/00/00
Credits	02
Evaluation Scheme: ISE /MSE / ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVPE304_1	Identify the properties of various composite materials used in civil engineering field by given supplementary materials.
2CVPE304_2	Evaluate the characteristics & performance of composite materials used in civil engineering field by analyzing standard testing data.
2CVPE304_3	Justify integrity of composite materials by using various destructive & non-destructive tests used in civil engineering.
2CVPE304_4	Utilize various composite materials in civil engineering work by understanding their properties.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Composites Concept of Composite, Basic Definitions and Classifications of Composites– Organic Matrix Composites- Based on Reinforcements and Matrices, Basic Constituent materials in Composites, Fibre Reinforced Composites (FRP) and laminated Composites,	07
Unit 2	Characteristics and Performance of Composite Materials Stress and Strain Concept, Plane stress concept, Mechanical properties, Thermal properties, Electrical properties, Chemical properties.	06
Unit 3	Composite Material Evaluation and Fabrication Destructive testing: tensile testing, compressive testing, and impact testing, Non-destructive testing: ultrasonic testing, radiography, acoustic emission testing, Composite bonding techniques.	06
Unit 4	Applications of Composite Materials in Civil Engineering Structural applications: beams, columns, plates, shells, and bridges, Non-structural applications: pipes, tanks, vessels, and other infrastructure components, Case studies highlighting the selection of materials for specific applications	07



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Text Books					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Composite Materials Technology: Process and Properties	Mallick, P. K	Hanser, New York	9 th	1990
02	Fundamentals of Composite Manufacturing	Strong A. B	SME	2 nd	1989
03	Mechanics of Composite Materials	Autar K. Kaw	Taylor & Francis	2 nd	2016
04	Fundamentals of Fibre Reinforced Composite Materials	A.R. Bunsell	CRC Press	1 st	2017

Reference Books / Handbooks :					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Mechanics of composite materials	R.M. Jones	Taylor and Francis	2 nd	1999
02	Composite Materials Design and Applications	Daniel Gay, Suong V. Hoa and Stephen W. Tsai,	CRC Press.	4 th	2002
03	Analysis and Performance of fibre composites.	Agarwal, B. D. and Broutman. L. J.	John-Wiley and Sons	3 rd	1980
04	Stress Analysis of Fiber-Reinforced Composite Materials	Michael W. Hyer	McGraw Hill	-	1999
05	Mechanics of Composite Materials and Structures	Mukhopadhyay, M.	University Press, India	-	2004


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Course Details:

Class	T. Y. B. Tech. Sem.-V
Course Code and Course Title	2CVPE305, Investment Planning and Management
Prerequisites	2CVPC206
Teaching Scheme: Lecture/Tutorial	02/00/00
Credits	02
Evaluation Scheme: ISE /MSE / ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVPE305_1	Practice the Financial Planning Standards and Code of Ethics and Professional Responsibility for investment management
2CVPE305_2	Understand the role of Investment planning in the personal risk analysis process, retirement planning process, etc.
2CVPE305_3	Identify the basic concept of ethical issues involved in the finance industry.
2CVPE305_4	Evaluate the appropriateness of tax strategies for different scenarios.
2CVPE305_5	Determine various goal-based strategies and evaluate investment choices in the context of client's financial planning needs.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Investment Products and their Applications Fixed Income Instruments, Mutual Fund Products, Equity Market, Derivatives and Commodities, Foreign Exchange Market, Real Estate and other Investments	07
Unit 2	Risk Profiling of Products and Investors- Asset Allocation Determination Types of Investment Risks, Product Profiling in terms of inherent Risk and Tenure, Risk Profiling of Investors, Asset Allocation- Financial Assets, Types of Asset Allocation Strategies	06
Unit 3	Goal-based Investment Planning, Measuring and Managing Risks, Analysis of Returns Investment Planning to achieve Financial Goals, Measuring Risk, Diversification Strategies, Analysis of Returns, Retirement Planning and Employee Benefits	07
Unit 4	Investment Strategies and Portfolio Management Active Investment Strategies, Passive Investment Strategies, Investment Portfolio Management, Revision of Portfolio, Tax Planning and Estate Planning	06


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Investment Analysis and Portfolio Management	Prasanna Chandra	Standard Publishers and Distributors	2 nd	2009
02	Risk Analysis & Insurance Planning	Sanjiv Bajaj and Indranil Sarkar	Mc Grill Publications Pvt Ltd	16 th	2005
03	Investment Planning Tax Planning and Estate Planning	Indian Institute of Banking and Finance	Indian Institute of Banking and Finance	5 th	2017

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Insurance Planning	Dalton	Gillice and Langdon from Money Education	7th	2016
02	Income Tax Planning	Thomas P. Langdon, E. Vance Grange, Michael A. Dalton	International Edition	14th	2013
03	Principles of Estate Planning, 3rd Edition	Carolynn Tomin and Colleen Carcone	International Edition	3rd	2013



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Course Details:

Class	T. Y. B. Tech. Sem.-V
Course Code and Course Title	2CVPE306, Public Health Engineering
Prerequisites	2CVHS206, Environmental Studies
Teaching Scheme: Lecture/Practical/ Tutorial	02/00/00
Credits	02
Evaluation Scheme: ISE /MSE / ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVPE306_1	Apply principles of water supply engineering to implement sustainable water supply, ensuring better public health.
2CVPE306_2	Utilize principles of waste water engineering to implement effective sanitation infrastructure, ensuring improved public health.
2CVPE306_3	Suggest solid waste management practices in mitigating environmental pollution to protect public health.
2CVPE306_4	Make use of integrated approaches for air pollution control and management, incorporating advanced technologies and strategies to improve air quality and minimize health risks associated with air pollution exposure.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Water Supply Engineering Overview of water sources and distribution systems, Importance of clean water for public health. Characteristics of drinking water quality, Drinking water quality standards and regulations. Introduction to water treatment methods: Aeration, Sedimentation, Filtration, Disinfection etc. Introduction to software applications for water quality modelling and simulation.	07
Unit 2	Wastewater Treatment Sources and types of wastewater. Objectives and principles of wastewater treatment. Parameters affecting wastewater quality: BOD, COD, suspended solids, etc. Introduction to biological, physical, and chemical wastewater treatment methods. Overview of software tools for wastewater treatment plant design and optimization.	06
Unit 3	Solid Waste Management Types and composition of solid waste, Solid waste generation rates and trends, Environmental and health considerations in solid waste disposal.	06


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	Functional elements of solid waste management system Overview of solid waste treatment methods: landfilling, composting, recycling, etc. Plastic and E-waste management methods. Application of software for waste stream characterization and landfill design.	
Unit 4	Air Pollution and Control Sources and types of air pollutants: particulate matter, gases, volatile organic compounds, etc. Health and environmental impacts of air pollution. Principles of air quality monitoring: sampling techniques, monitoring stations. Air quality indices and standards. Overview of air pollution control devices: gravity settlers, electrostatic precipitators, scrubbers, adsorbers, fabric filters etc. Introduction to software tools for air quality modelling and prediction.	07

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Water Supply Engineering	Garg, S. K.	Khanna Publishers	33rd	2010
02	Sewage disposal and Air pollution Engineering	Garg, S. K.	Khanna Publishers	33rd	2015
03	Air Pollution	M N Rao, HVN Rao	McGraw-Hill Education	1st	2001
04	Elements of Environmental Engineering	Duggal K. N.	S. Chand	1st	2016


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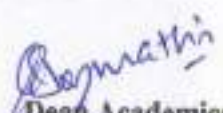

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Environmental Engineering	Howard S. Peavy, Donald R. Rowe	McGraw Hill Education Edition	1st	2017
02	Environmental pollution and control	H.S. Bhatia	Galgotia Publications Pvt. Ltd.	1st	2018

Codes:

1. IS 10500: 2012, Drinking Water specification (Second Revision)
2. Manual on Sewerage and Sewage Treatment, CPHEEO, Ministry of Housing and Urban Affairs Development, Govt., of India, New Delhi, 2013.
3. Manual on Municipal Solid Waste Management, CPHEEO, Ministry of Housing and Urban Affairs Development, Govt., of India, New Delhi, 2016.



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Course Details:

Class	T. Y. B.Tech. Sem.-V
Course Code and Course Title	2CVPE307, Site Investigation Methods & Practices
Prerequisites	2CVPC302
Teaching Scheme: Lecture/Tutorial	02/00
Credits	02
Evaluation Scheme: ISE /MSE / ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVPE307_1	Select suitable site for construction of civil structures using ground characteristic criteria.
2CVPE307_2	Choose reliable subsurface exploration technique for identification of depth wise sequence of soil and rock layers by utilizing drilling methods.
2CVPE307_3	Prepare detail site investigation report to showcase site characteristics with the help of soil tests, geophysical survey, and core logging results.
2CVPE307_4	Differentiate between result interpretation methods to know physical properties of subsurface materials by choosing appropriate geophysical method.
2CVPE307_5	Identify characteristics of objects on aerial photograph for aerial photo interpretation depending on aerial photo recognition elements.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Site Investigation Introduction, Site selection criteria, the Importance of Site Investigation, Purposes of a Site Investigation, Objectives, Need for Site investigation, Advantages of Site Investigation, Phases in site investigation process	07
Unit 2	Methodology of Site Investigation Preliminary site investigation: Preliminary desk study, Topographical maps, Geological records, Mining records, Air photo interpretation, Drone Surveying, Importance of GPS in site investigation, Site walk-over survey, Reconnaissance of site works.	06
Unit 3	Site Investigation using Non-Destructive Tests Introduction, Electrical Methods, Magnetic Methods, Gravity Methods, Acoustic Emission Methods, Seismic Methods	07
Unit 4	Exploratory Drilling Observations, Preservation of cores and Core logging, Core recovery, R.Q.D. Technical Report Writing-Standard formats for preparation of a site investigation report	06


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Site Investigation Practice	Clayton, Mathews and Simons	Halsted Press	2 nd	2004
02	A short course in Geotechnical site investigation	Simons, Menzies, Matthews	Thomson Telford Ltd. London	1 st	2002
03	Site Investigation Practice	Joyce, M.D.	ESFN, SPON Publishers	2 nd	2012
04	Fundamentals of Geophysics	William Lowrie, Andreas Fichtner	Cambridge University Press	3 rd	2017
05	Advanced Surveying	Satheesh Gopi	Pearson Education	2 nd	2006

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Geotechnical Engineering Investigation Handbook	R.E. Hunt	CRC Press	2 nd	2005
02	Geotechnical and Geophysical Site Characterization	An-Bin Huang, Paul W Mayne	CRC Press	1 st	2008
03	Principles of Soil Dynamics	Braja M. Das and Zhe Luo	Cengage	1 st	2017
04	Advances in site investigation practice	proceedings of the international conference on advances in site investigation practice	ICE Virtual Library	1 st	1996
05	Effective Site Investigation	C.R.I. Clayton and D.M. Smith	ICE Virtual Library	1 st	2013


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Course Details:

Class	T. Y. B. Tech. Sem.-V
Course Code and Course Title	2CVPE308, Remote Sensing
Prerequisites	2CVPC204
Teaching Scheme: Lecture/Tutorial	02/00
Credits	02
Evaluation Scheme: ISE /MSE / ESE	40/30/30

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
2CVPE308_1	Experimenting with the remote sensing data for mapping of earth surface features using supplementary resources.
2CVPE308_2	Preparing the data analysis sheet by preprocessing techniques using available remote sensing software and datasets.
2CVPE308_3	Presenting meaningful information for specific applications by interpreting and validating results using ground truth data.
2CVPE308_4	Apply remote sensing techniques to solve problems in fields such as agriculture, forestry, urban planning, and disaster management under a specific problem scenario and relevant datasets

Course Contents:		
Unit No.	Title	Hrs.
Unit 1	Physics of Remote Sensing Sources of Energy, Active and Passive Radiation, Electromagnetic Radiation – Reflectance, Transmission, Absorption, Thermal Emissions, Interaction with Atmosphere, Atmospheric windows, Spectral reflectance of Earth's surface features, and Multi concept of Remote Sensing.	06
Unit 2	Platforms and Sensors Various types of platforms, different types of aircraft, manned and unmanned spacecraft used for data acquisition – characteristics of different types of platforms – airborne and spaceborne, IRS Satellite Sensors, LANDSAT, SPOT, IKONOS, Quickbird, GeoEye, Kompsat, Worldview II & III, Microwave, ALOS, Planet Data, Sentinel, SMAP, MODIS etc	07
Unit 3	Thermal Remote sensing Infrared Scanners, Scatterometer, Thermal Properties of Terrain, Thermal IR Environmental Considerations, Thermal Infrared and Thermal Scanners,	06
Unit 4	Data Acquisition Systems and Applications Optical, Thermal and Microwave; Resolutions – spatial, spectral, radiometric and temporal, Applications of Remote sensing in various Engineering and Science domains such as Agriculture, Forest, Soil, Geology, LU/LC, Water Resources, Urban, Disaster Management, etc	07


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Introduction to Remote Sensing	James B. Campbell & Randolph H. Wynne,	The Guilford Press	--	2011
02	Remote sensing of the environment: An Earth resource perspective,	John R. Jensen	Pearson Education India	2 nd	2013
03	Remote Sensing and Image Interpretation	Lillesand T.M & Kiefer R.W.	John Wiley and Sons,	--	2015
04	Remote Sensing and Image Interpretation	Jonathan Chipman, Ralph W. Kief Thomas Lillesand	John Wiley and Sons,	7 th	2015

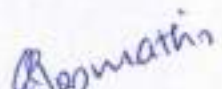
Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Remote Sensing and Global Environmental Change	Sam J. Purkis, Victor V. Klemas	Wiley	--	2011
02	Manual of Remote Sensing, Remote Sensing for Natural Resource Management and Environmental Monitoring	American Society for Photogrammetry and Remote Sensing	Wiley	--	2004
03	Remote Sensing Principles, Interpretation, and Applications,	Floyd F. Sabins, Jr., James M. Ellis	Waveland Press	--	2020
04	Introductory Digital Image Processing A Remote Sensing Perspective	Pearson Education,	Pearson Education India	--	2016

Online Resources:

1. <https://nptel.ac.in/courses/105/108/105108077/>
2. <https://nptel.ac.in/courses/105/101/105101206/>
3. <https://nptel.ac.in/courses/105/107/105107201/>



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Course Details:

Class	T. Y. B. Tech. Sem.-V
Course Code and Course Title	2CVSA309, Global Navigation Satellite Systems
Prerequisites	2CVSA213
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE /MSE / ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVSA309_1	Analyze GNSS data to determine accurate positions and velocities using appropriate techniques like Static, RTK, PPK.
2CVSA309_2	Evaluate the performance of GNSS receivers and identify sources of error in satellite-based positioning using RTK and PPK technique
2CVSA309_3	Apply GNSS positioning methods to solve navigation and tracking problems in engineering applications using various methods.
2CVSA309_4	Design integrated solutions using GNSS and other technologies to solve complex spatial challenges in engineering problems.
2CVSA309_5	Demonstrate the principles and applications of Global Navigation Satellite Systems using GNSS and Remote Sensing.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to GNSS Overview of Global Navigation Satellite Systems, History and Development of GNSS, Basic Principles of Satellite-Based Positioning, Types of GNSS Constellations (GPS, GLONASS, Galileo, BeiDou)	07
Unit 2	GNSS Signals and Receivers GNSS Signal Structure and Characteristics, GNSS Receiver Architecture, Signal Processing Techniques in GNSS Receivers, Error Sources in GNSS Positioning	07
Unit 3	GNSS Positioning Techniques GNSS Positioning Methods (Single Point, Differential, Precise Point Positioning), Real-time Kinematic (RTK) Positioning, GNSS Data Processing and Analysis, GNSS Augmentation Systems	06
Unit 4	GNSS Applications Navigation and Tracking Applications of GNSS, GNSS in Surveying and Mapping, GNSS in Transportation and Vehicle Navigation Systems, GNSS in Timing and Synchronization.	06
Unit 5	Integration of GNSS with Other Technologies Integration of GNSS with Inertial Navigation Systems (INS), GNSS and	06


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	Geographic Information Systems (GIS), GNSS and Remote Sensing Technologies, Case Studies and Examples of GNSS Integration.	
Unit 6	Future Trends in GNSS GNSS Modernization and Upcoming Developments, Emerging Trends in GNSS Applications (e.g., IoT, Autonomous Vehicles), Challenges and Limitations of GNSS Technology, Future Directions and Career Opportunities in GNSS	07

Text Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Understanding GPS: Principles and Applications	Elliott Kaplan and Christopher Hegarty	Artech House	2 nd	2005
02	Global Positioning Systems, Inertial Navigation, and Integration	Mohinder S. Grewal, Lawrence R. Weill, and Angus P. Andrews	Wiley-Interscience	1 st	2007
03	GPS Satellite Surveying	Alfred Leick, Lev Rapoport, and Dmitry Tatarnikov	John Wiley & Sons, Inc	1 st	2015
04	Global Positioning System: Signals, Measurements, and Performance	Pratap Misra and Per Enge	Ganga-Jamuna Press	2 nd	2010

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	GPS for Land Surveyors	Jan Van Sickle	CRC Press	1 st	2015
02	Introduction to GPS: The Global Positioning System	Ahmed El-Rabbany	Artech House	1 st	2005
03	Principles of GNSS, Inertial, and Multisensor Integrated Navigation Systems	Paul D. Groves	Artech House	3 rd	2013
04	Engineering Satellite-Based Navigation and Timing: Global Navigation Satellite Systems, Signals, and Receivers	John W. Betz	Wiley	1 st	2016




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Course Details:

Class	T. Y. B. Tech. Sem.-V
Course Code and Course Title	2CVEN310, Water & Waste Water Engineering
Prerequisites	2CVHS206, Environmental Studies
Teaching Scheme: Lecture/Practical/ Tutorial	03/00/00
Credits	03
Evaluation Scheme: ISE /MSE / ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVEN310_1	Identify sources of water with respect to its quality and quantity for water supply.
2CVEN310_2	Choose different water treatment processes to render the water quality suitable for drinking.
2CVEN310_3	Develop proficiency in the operation and maintenance of water supply systems, including the identification of causes and impacts of water losses.
2CVEN310_4	Apply of fundamental principles underlying waste water engineering to form the sewerage system.
2CVEN310_5	Manipulate various rules and regulations as a tool to control pollution of water.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Fundamentals of Water Treatment Sources of water, Evaluation of surface water and groundwater sources. Factors influencing the selection of water sources: quantity, quality, accessibility, sustainability. Introduction to Water Quality, Overview of water quality parameters and their significance.	06
Unit 2	Water treatment Treatment: Philosophy, Unit processes and operations. Aeration: Process, Types of aerators. Coagulation and Flocculation: Theory, Practices. Settling: Theory, Types. Granular Filtration: Classification, Theory of deep mono and dual bed filter. Components of deep bed filter, Filter operation, sizing of beds. Disinfection: Types, Chemistry of chlorination, Chlorine demand, Chlorination practice, UV and Ozone disinfection. Overview of membrane filtration technologies: reverse osmosis, nanofiltration, ultrafiltration.	07
Unit 3	Water Distribution Systems Overview of gravity-fed and pressurized water distribution systems. Operation and maintenance of Water supply system, Causes and impacts of water losses in distribution systems, Strategies for leakage detection, repair, and	06


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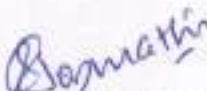

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	water loss reduction.	
Unit 4	Fundamentals of Wastewater Engineering Wastewater: Sources, Characteristics Gravity sewer collection system: Types of Sewerage systems, pipe materials, and hydraulic capacity.	07
Unit 5	Wastewater treatment processes Wastewater treatment: Philosophy, Overview of primary, secondary, and tertiary treatment processes Primary treatment: Screening, Grit removal, Settling Biological/Secondary treatment: Fundamentals of aerobic and anaerobic treatment, Conventional Activated Sludge Process (ASP), Low-Cost Wastewater Treatment Technologies: Constructed wetlands, Rotating biological contactors, oxidation ditch and Waste stabilization pond, Septic tank.	07
Unit 6	Water pollution control Overview of national and international regulations, strategies for pollution prevention, monitoring techniques, compliance requirements, and enforcement mechanisms.	06

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Water Supply Engineering	Garg, S. K.	Khanna Publishers,	43rd	2024
02	Water Supply Engineering (Environmental Engineering I)	Modi, P. N.	Standard Book House,	6th	2018
03	Wastewater Engineering: Treatment and Resource Recovery	Metcalf & Eddy	McGraw-Hill Education	5th	2014
04	Water and Wastewater Engineering Technology	Subhash Verma	CRC Press	1st	2023



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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Water and Wastewater Technology	Hammer M, J and Hammer M, J,	PHI learning private limited	7 th	2018
02	Environmental Engineering	Howard S. Peavy, Donald R. Rowe, George Tchobanoglous	McGraw Hill Education Edition	1 st	2017
03	Water and Wastewater Technology	Mark J. Hammer and Mark J. Hammer Jr.	Pearson	8 th	2017
04	Water and Wastewater Engineering: Design Principles and Practice	Mackenzie L. Davis	McGraw-Hill Education	2 nd	2019




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Course Details:

Class	T.Y.B. Tech. Sem.-V
Course Code and Course Title	2CVEL311, In-Plant Training
Prerequisite/s	2CPVC103, 2CVPC113
Teaching Scheme: Lecture/Tutorial	00/01
Credits	01
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVEL311_1	Apply theoretical knowledge to practical civil engineering tasks in an industrial setting.
2CVEL311_2	Execute engineering drawings and specifications according to industry standards.
2CVEL311_3	Collaborate effectively within multidisciplinary teams to achieve project goals.
2CVEL311_4	Apply safety regulations and protocols in civil engineering operations.
2CVEL311_5	Evaluate the economic and environmental impact of engineering solutions.

The students are required to undergo rigorous field training in Civil Engineering at least for 15 days after end of IVth semester. Field training work will be evaluated in the Vth semester. At the end of the course each student has to submit a report which will be consisting of a certificate from the Officer in-charge of training from the industry highlighting the topics to which the student is exposed to in the field. The student is required to make a presentation of the skills that he has acquired during the in-plant training.


The Site Work shall consist of:

1. Survey and Layout
2. Actual Site measurement
3. Quality control on site
4. Evaluation of Specification for Building materials.

The report shall consist of:


1. Company/Project details.
2. Site layout
3. Building materials details
4. Bar chart of work done
5. Daily material consumption and Work progress report
6. Knowledge & Skills acquire from field training.

Evaluation of field work report will be done by the Departmental Committee.


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Course Details:

Class	T.Y B.Tech., Sem - V
Course Code and Course Title	2CVHS312 - Entrepreneurship
Prerequisite/s	---
Teaching Scheme: Lecture/Tutorial	00/00/02
Credits	01
Evaluation Scheme: ISE	50/00

Course Objectives:

1. This course aims to equip engineering students with the knowledge and skills to identify opportunities, develop innovative solutions, and launch successful engineering-based ventures.

Course Outcomes (CO's):

After successful completion of this course, the student will be able to,

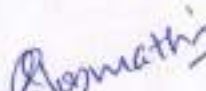
Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
2CVHS312_1	Identify and evaluate potential business opportunities in the engineering domain.
2CVHS312_2	Conduct market research and analyze the competitive landscape.
2CVHS312_3	Craft a comprehensive business plan, including financial projections.
2CVHS312_4	Understand the fundamentals of marketing, sales, and operations for engineering ventures.
2CVHS312_5	Pitch their business ideas to potential investors.
2CVHS312_6	Grasp the legal and ethical considerations of starting a business.

Course Contents:

1. The Entrepreneurial Ecosystem
2. Idea Identification and Prototyping
3. Testing, Validation and Commercialization
4. Market Analysis and Competitive Landscape
5. Legal Procedure to setup an Startup Business
6. Understanding Finance Basics
7. Business Planning and Development
8. Marketing and Sustainability
9. Pitching and Fundraising
10. Startup Case Studies



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- **Assessment 1:** Business Plan
- **Assessment 2:** Peer Review of Business Plan
- **Assessment 3:** Elevator Pitch Competition
- **Assessment 4:** "Shark Tank" Simulation

Reference Materials:

1. <https://www.startupindia.gov.in/content/sih/en/international/go-to-market-guide/indian-startup-ecosystem.html>
2. https://www.startupindia.gov.in/content/sih/en/learning-and-development_v2.html
3. https://onlinecourses.nptel.ac.in/noc24_mg93/preview

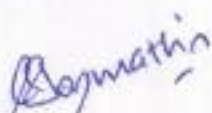
Assessment Modes:

Sl No	Method/Technique	Course Outcomes						Marks		Weightage
		1	2	3	4	5	6	Max	Min	
01	ISE: BP	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	10	20	20 %
02	ISE: PR	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	10		20 %
03	ISE: EPC	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	10		20 %
04	ISE: STS	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	20		40 %

- ISE - In-Semester Examination,
- BP - Business Plan, PR - Peer Review of Business Plan
- EPC - Elevator Pitch Competition, STS - "Shark Tank" Simulation



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Course Details:

Class	T.Y. B. Tech. Semester-V
Course Code and Course Title	2CVCC313, Reasoning and Soft Skill Part - III
Prerequisite/s	2CVCC258, Aptitude and Reasoning Part- II
Teaching Scheme: Lecture/Tutorial /Practical	00/00/02
Credits	01
Evaluation Scheme: ISE / ESE	50/00

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:


2CVCC313_1	Solve problem based on basic and advance Permutation and Combination
2CVCC313_2	Solve problem based on Probability, Application of Probability, Cubes, Dices, cube painting and Syllogism
2CVCC313_3	Solve problem based on Mensuration 3D, Circle & Triangle
2CVCC313_4	Demonstrate on Resume writing skill, closed, advanced grammar, Synonyms and Antonyms

Course Syllabus

Unit No.	Title	Hrs.
Unit 1	<ul style="list-style-type: none"> • Basic Permutation and Combination • Advance Permutation and Combination 	04
Unit 2	<ul style="list-style-type: none"> • Probability • Application of Probability 	04
Unit 3	<ul style="list-style-type: none"> • Cubes, Dices & cube painting • Syllogism 	04
Unit 4	<ul style="list-style-type: none"> • Mensuration 3D • Circle & Triangle 	04
Unit 5	<ul style="list-style-type: none"> • Resume writing & resume making • Interview Techniques 	04
Unit 6	<ul style="list-style-type: none"> • Closed Test & advanced Grammar • Synonyms & Antonyms 	04

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Quantitative Aptitude for Competitive Examinations	R.S. Agarwal	S Chand	Revised	2022
02	A Modern Approach to Verbal & Non-Verbal Reasoning	R.S. Agarwal	S Chand	Revised	2024
03	English Grammar and Composition (Verbal, Grammar)	P. C. Wren and H Martin	S Chand	2 nd	2019


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**Annasaheb Dange College of Engineering
and Technology, Ashta
An Autonomous Institute**

**T. Y. B. Tech. Structure
(NEP 170 Credits)**

CIVIL ENGINEERING

SEM V- VI

Annasaheb Dange College of Engineering and Technology Ashta
Department of Civil Engineering
 Teaching and Evaluation Scheme



Course Code	Course Name	T. Y. B. Tech Semester VI										GRAND TOTAL				
		Teaching Scheme				THEORY					PRACTICAL					
		L	T	P	Credits	ISE Max	ISE Min	MSE	ESE	ESE Min	Total Min		ISE Max	ISE Min	ESE Max	ESE Min
2BCE3xx	Open Elective-II	3	-	-	3	50	20	-	-	-	50	20	-	-	-	50
2CVPC314	Theory of Structures	3	-	-	3	40	16	30	30	24	100	40	-	-	-	100
2CVPC315	Environmental Engineering	3	-	2	4	40	16	30	30	24	100	40	50	20	100	200
2CVPC316	Design of RCC Structures	3	-	-	3	40	16	30	30	24	100	40	-	-	-	100
2CVPE3**	Program Elective-II	3	-	2	4	40	16	30	30	24	100	40	50	20	50	150
2CV**3**	Minor Course - III	3	-	-	3	40	16	30	30	24	100	40	-	-	-	100
2CVS324	Structural Design and Drawing I (Mini. Project)	-	-	2	1	-	-	-	-	-	-	-	50	20	50	100
2CVEL325	Software Training I	-	-	2	1	-	-	-	-	-	-	-	50	20	50	50
2CVCC326	Recomming and Soft Skill Part - IV	-	-	2	1	-	-	-	-	-	-	-	50	20	50	50
Total Contact Hours		18	0	10	23											900
																28

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Program Elective - II (Semester VI)			
	Course	Laboratory	Domain
2CVPE317	Structural Audit	Structural Audit Laboratory	Structural Engineering
2CVPE318	Safety Aspects in Civil Engineering	Safety Aspects in Civil Engineering Laboratory	Construction Management
2CVPE319	Sustainable Management of Solid Waste	Sustainable Management of Solid Waste Laboratory	Environment Engineering
2CVPE320	Smart Cities	Smart Cities Laboratory	Geotechnical and Transportation Engineering
2CVPE321	Engineering Geology	Engineering Geology Laboratory	Geoinformatics & Geology

Minor Course - III (Semester VI)			
Sr. No.	Course Code	Minor Course-III	Domain
1	2CVSA322	Remote Sensing and GIS	Surveying and Its Applications
2	2CVEN323	Solid Waste Management	Environment Engineering

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**Annasaheb Dange College of Engineering
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**T. Y. B. Tech. Curriculum
(NEP 170 Credits)**

CIVIL ENGINEERING

SEM V- VI

Course Details:

Class	T, Y. B. Tech. Sem.- VI
Course Code and Course Title	2CVPC314, Theory of Structures
Prerequisites	2CVPC202, 2CVPC211
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE /MSE / ESE	40/30/30

Course Outcomes (COs):

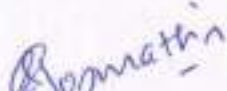
Upon successful completion of this course, the student will be able to:

2CVPC314_1	Classify a given structure to interpret degree of indeterminacy by computing static and kinematic.
2CVPC314_2	Analyze statically indeterminate beams by using any force method.
2CVPC314_3	Estimate all support reactions of indeterminate structures by using matrix methods.
2CVPC314_4	Investigate kinematically indeterminate structure by using slope deflection method or moment distribution method.
2CVPC314_5	Analyze indeterminate portal frames using any structural approach method.


Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Structures: Types of structures, Determinate and Indeterminate Structures, Static and kinematic indeterminate structures Consistent Deformation Method: Applications to propped cantilever and fixed beams, beams with varying M. I. (Max. Degree = 2).	07
Unit 2	Strain Energy Method: Strain energy due to various forces, Castigliano's theorem, Application to statically, Indeterminate structures - Portal frames, Analysis of indeterminate trusses (Max. Degree = 2).	06
Unit 3	Slope Deflection Method: Slope deflection equations, applications to beams, Portal frames with and without sway. Modified slope deflection method. (Max. Degree = 2).	06
Unit 4	Moment Distribution Method: Relative and absolute stiffness, Distribution factors, Sinking of Supports, Applications to beams, Portal frames with and without sway (Max. Degree = 2).	06
Unit 5	Matrix Method: Introduction to flexibility, flexibility coefficients, Development of flexibility matrix, Analysis of beams (Max. Degree = 3). Introduction to stiffness, stiffness coefficients, Development of stiffness matrix, Analysis of beams (Max. Degree = 3).	07


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Unit 6	Structural Approach Methods: Difference between structural and member approach methods, Introduction to Portal frame analysis method and numericals, Introduction to Cantilever analysis method and numericals.	07
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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Basic Structural Analysis	Reddy C. S.	Tata McGraw Hill Publication Company Ltd.	3rd	2017
02	Structural Analysis - Matrix Approach	Pandit and Gupta	Tata McGraw Hill Publication Company Ltd.	2nd	2008
03	Mechanics of Structures (Vol. II)	S. B. Junnarkar	Charator Book Publishing House	24th	2015
04	Structural Analysis	R. C. Hibbeler	Pearson Prentice Hall	9th	2017
05	Structural Analysis Vol. I	S. S. Bhavikatti	Vikas Publishing House	4th	2011

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Theory of Structures	Timoshenko & Young	Tata McGraw Hill Publication Company Ltd.	2nd	1965
02	Modern Methods in Structural Mechanics - I	B. N. Thadani	Asia Publishing House, New Delhi	4th	1964
03	Indeterminate Structural Analysis	C. K. Wang	Tata McGraw Hill Publication Company Ltd.	3rd	2012
04	Structural Analysis Vol. II	S. S. Bhavikatti	Vikas Publishing House	4th	2013
05	Advanced Structural Analysis	Devdas Menon	Alpha Science International Ltd.	2nd	2017


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Course Details:

Class	T. Y. B. Tech. Sem.-VI		
Course Code and Course Title	2CVPC315, Environmental Engineering		
Prerequisites	2CVHS206		
Teaching Scheme: Lecture/Practical/ Tutorial	03/02/00		
Credits	04		
Evaluation Scheme	T	ISE / MSE / ESE	40/30/30
	P	ISE	50

Course Outcomes (COs):

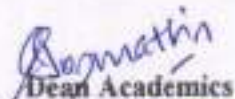
Upon successful completion of this course, the student will be able to:

2CVPC315_1	Apply the fundamental principles underlying water treatment to estimate capacities for water supply systems.
2CVPC315_2	Design various components of water treatment plant and distribution system of given design capacity referring the standard parameters.
2CVPC315_3	Apply the fundamental principles underlying wastewater engineering to design the components of sewerage system.
2CVPC315_4	Identify various conventional and low-cost processes to treat the wastewater considering characteristics of wastewater to be treated.
2CVPC315_5	Manipulate various rules and regulations, and strategies as a tool to control the pollution of water.
2CVPC315_6	Professionally comment on the quality of water and suggest the desired treatment by characterizing the sample using various physico-chemical tests.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Fundamentals of Water Treatment Sources of water, Evaluation of surface water and groundwater sources. Factors influencing the selection of water sources: quantity, quality, accessibility, sustainability. Introduction to Water Quality, Overview of water quality parameters and their significance, Methods for population forecasting. Estimation of water demand for various sectors: residential, industrial, etc. Estimation of fire demand.	06
Unit 2	Water treatment processes Treatment: Philosophy, Unit processes and operations. Intake structures and rising main. Aeration: Process, Types of aerators, Design of cascade aerator. Coagulation and Flocculation: Theory, Practices, sizing of units. Settling: Theory, Types, Design circular clarifiers for type 1 settling. Granular Filtration: Classification, Theory of deep mono and dual bed filter. Components of deep bed filter, Filter operation, sizing of beds. Disinfection: Types, Chemistry of chlorination, Chlorine demand,	08


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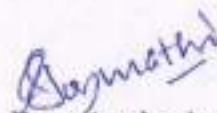

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	Chlorination practice, UV and Ozone disinfection. Overview of membrane filtration technologies: reverse osmosis, nanofiltration, ultrafiltration.	
Unit 3	Water Distribution Systems Overview of gravity-fed and pressurized water distribution systems. Design considerations for pipeline networks, pumps, and storage reservoirs. Operation and maintenance of Water supply system, Causes and impacts of water losses in distribution systems, Strategies for leakage detection, repair, and water loss reduction. Introduction to software for design of water distribution system.	06
Unit 4	Fundamentals of Wastewater Engineering Wastewater: Sources, Flow rate and variations, Quantitative estimation, Characteristics Gravity sewer collection system: Types of Sewerage systems, Design considerations for sewer layout, pipe materials, and hydraulic capacity. Design of sewerage system, sewer appurtenances. Introduction to software for design of sewerage system	06
Unit 5	Wastewater treatment processes Wastewater treatment: Philosophy, Overview of primary, secondary, and tertiary treatment processes Primary treatment: Screening, Grit removal, Settling Biological/Secondary treatment: Fundamentals of aerobic and anaerobic treatment, Conventional Activated Sludge Process (ASP) and modifications, Process design and operating parameters, Operational problems. Low-Cost Wastewater Treatment Technologies: Constructed wetlands, Rotating biological contactors, oxidation ditch and Waste stabilization pond, Septic tank: concept and design.	08
Unit 6	Disposal of wastewater Methods, Effluent standards. Stream pollution: Self-purification (Stream rejuvenation), DO sag curve, Streeter Phelps's equation for point source, Stream classification. Introduction of water quality index.	05



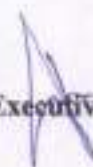
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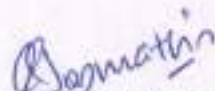


Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Water Supply Engineering	Garg, S. K.	Khanna Publishers,	33rd	2010
02	Water Supply Engineering (Environmental Engineering I)	Modi, P. N.	Standard Book House,	6th	2018
03	Water Supply and Wastewater Engineering	Raju, B.S.N.,	Tata McGraw Hill Private limited, New Delhi,	2nd	2000.
04	Water Supply Engineering	Garg, S. K.	Khanna Publisher	37th	2023

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Water and Wastewater Technology	Hammer M, J and Hammer M, J,	PHI learning private limited	7th	2018
02	Environmental Engineering	Howard S. Peavy, Donald R. Rowe, George Tchobanoglous	McGraw Hill Education Edition	1st	2017
03	Water and Wastewater Engineering	Mackenzie L. Davis	McGraw-Hill Education	2nd	2019
04	Wastewater Engineering: Treatment and Resource Recovery	Metcalf & Eddy, Inc., George Tchobanoglous, H. David Stensel, Ryujiro Tsuchihashi, and Franklin L. Burton	McGraw-Hill Education	5th	2013


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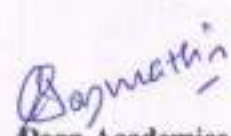
1. IS 10500: 2012, Drinking Water specification (Second Revision)
2. Manual on Sewerage and Sewage Treatment, CPHEEO, Ministry of Housing and Urban Affairs Development, Govt., of India, New Delhi, 2013.
3. Manual on Municipal Solid Waste Management, CPHEEO, Ministry of Housing and Urban Affairs Development, Govt., of India, New Delhi, 2016.

Course Contents:


At least 8 Laboratory experiments on water and waste water characterization along with one design project and two plant visits:

Expt. No.	Title of Experiment
01	Any 8 Experiments from following list Introduction to standards, collection and preservation of samples, sampling techniques. Determination of pH of given water sample. Determination of acidity of given water sample. Determination of alkalinity of given water sample. Determination of conductivity of given water sample. Determination of turbidity of given water sample. Determination of hardness of water sample. Determination of chloride content of water sample. Determination of DO content of given water sample. Determination of different types of solids of given water sample. Determination of optimum alum dose for given water sample. Determination of BOD of given waste water sample. Determination of COD content of given waste water sample.
02	Visit to water and waste water treatment plant.
03	Design of a conventional water/ waste water treatment plant.


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Course Details:

Class	T. Y. B. Tech. Sem.-VI
Course Code and Course Title	2CVPC316, Design of RCC Structures
Prerequisite/s	2CVPC202, 2CVPC211, 2CVVS301.
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE/MSE/ ESE	40/30/30


Course Outcomes (COs):

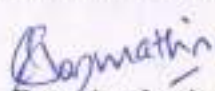
Upon successful completion of this course, the student will be able to:

2CVPC316_1	Analyse the different parameters used in reinforced concrete by limit state method
2CVPC316_2	Illustrate shear parameters of different structural members by limit state method
2CVPC316_3	Analyse the reinforcement details of the slab and staircase by limit state method
2CVPC316_4	Evaluate various design parameters of beams by limit state method
2CVPC316_5	Estimate sectional properties of column and footing by limit state method


Course Contents:

Unit No.	Title	Hrs.
Unit 1	Limit State Method: Introduction- Stress-strain behaviour of concrete and steel, Behaviour of RCC, Properties of concrete and reinforcing steel, Permissible stresses in steel and concrete, Different design philosophies, various limits states, Characteristic strength and Characteristic load, Load factor, Partial safety factors.	06
Unit 2	Limit State collapse: a) Limit state of collapse (shear and bond): Shear failure, Types of Shear reinforcement, Design of Shear reinforcement, Bond-types, Factors affect in bond Resistance, Anchoring reinforcing Bars in Tension and Compression, Check for development length, Types of cracks.	06
Unit 3	Beam: Limit state of collapse (flexure): Stress in Compression reinforcement, Serviceability considerations in beam design, Analysis and Design of Singly and Doubly Reinforced rectangular sections, Cantilever beam, Design of Continuous beam by IS coefficient method	07
Unit 4	T & L Beam: Analysis of singly reinforced T and L beams, Depth of Neutral Axis within Flange, Depth of Neutral Axis outside Flange, Design of singly reinforced T and L beams.	06
Unit 5	Slab & Staircase: a) Design of slabs: Cantilever Slab, simply supported One way slab, two-way slab with different support conditions as per IS: 456-2000. Deflection control in slabs. Detailing of slab reinforcements. b) Design of Simply Supported single flight and Dog legged staircase.	07
Unit 6	Column & Footing: Types of footings and their design considerations, Analysis and Design of axially loaded circular and rectangular columns, Circular column with helical reinforcement, Interaction diagrams for column design	07


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	Design of isolated rectangular & Square column footing with constant depth subjected to axial load	
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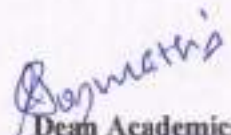
Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Reinforced Concrete Structural element	Purushotaman.P	McGraw Hill Publication Co.Ltd.	4 th	2020
02	Reinforced Concrete VOL.II (Advanced Reinforced Concrete)	HJ Shah	Charotar Publishing House Pvt. Ltd	7 th	2019
03	R.C.C Design & Drawing	Neelam Sharma	Charotar Publishing House Pvt. Ltd	3 rd	2019
04	Reinforced Concrete VOL.I	HJ Shah	Charotar Publishing House Pvt. Ltd	7 th	2019

NOTE: It is necessary to have knowledge of IS Code, Use of 456:2000 and SP16.

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Design of Reinforced Concrete Structures	S. Ramamrutham	Dhanpat Rai Publishing Company	16 th	2019
02	Limit State Design	B. C. Punmia, A. K. Jain	Laxmi Publications Ltd.	3 rd	2019
03	R.C.C Designs	B.C.Punmia, A.K.Jain, Arun K Jain	Charotar Publishing House Pvt. Ltd	7 th	2020
04	Illustrated Design of R. C. Buildings	V. L. Shah, S. R. Karve	Structures Publisher	8 th	2020
05	IS 456-2000	Indian Standard Code	B. I. S., New Delhi	4 th	2021
06	SP16	Design Aids For Reinforced Concrete	B. I.S., New Delhi	2 nd	2016




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Course Details:

Class		T. Y. B. Tech. Sem.-VI	
Course Code and Course Title		2CVPE317, Structural Audit	
Prerequisites		2CVPC210	
Teaching Scheme: Lecture/Practical		03/02	
Credits		04	
Evaluation Scheme	T	ISE / MSE / ESE	40/30/30
	P	ISE	50


Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVPE317_1	Discuss the basics of structural Audit and its legal aspects for various civil structures by considering government acts.
2CVPE317_2	Identify parameters of visual inspection of different civil structures with the help of structural defects mapping.
2CVPE317_3	Examine the different health parameters of the civil structures using NDT and SDT Techniques.
2CVPE317_4	Prepare an audit report of civil structures by analyzing data collected from different auditing method

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Structural Auditing: Introduction and Necessity of structural Auditing, Structural failure of Building, Structural failure of Bridges, Structural failure of public transport system, Structural failure of industry, Design life structures.	06
Unit 2	Legal aspects and awareness: Introduction to legal aspects and awareness, Insurance scheme, Government act and circulars-Guidelines for public and private participation, Awareness about safety, precautions, Structural Auditor registration.	07
Unit 3	Structural Auditing Records: Introduction to defect mapping and accessibility to records, Structural condition: Visual inspection, Reason of distress, Safety and Quality, Availability of drawing, Maintenance records, Inspection records, Accessibility Records.	06
Unit 4	Methods of Testing of structures: Visual inspection of structures, Nondestructive testing: Rebound hammer test, Rebar locator test, semi destructive test: Ultra sonic pulse velocity method, Carbonation test, Half-cell potentiometer test, Computerized testing, Destructive testing, Interpretation of tests	07
Unit 5	Structural Audit Report: Introduction to Audit report, Drawing specifications, Structural Audit Reports for different types of buildings, Tenders for Repairs of structures. Necessity and importance of Budget estimation, Steps in budget	07


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	estimation.	
Unit 6	Audit of Structures: History of structure, Structural drawing with details, Visual inspection, Nondestructive, destructive testing, Structural Audit report, Introduction to Repairs of structures, Methods of repair of structures. Case study of Buildings, Steel structures, Bridges, Roads.	06

Text Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Building. Structural Audit, Repairs and Restoration	Arun Kelkar	Majestic Publishing House	1st	2018
02	Structural Health Monitoring of Long span suspension bridges	You-Lin Xu and Yong Xia	CRC Press	1st	2017
03	Non-Destructive Testing of Materials and Structures	Buyukozturk, O & Tasdemir, M. A.	Springer Pvt. ltd. New Delhi	1st	2013
04	Maintenance, Repair and Rehabilitation of works of buildings	P. C. Verghese	PHI Learning Pvt. Ltd.	1st	2014
05	Concrete Technology	M. S. Shetty, A. K. Jain	S Chand and Company Ltd.	18th	2019

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	CPWD – Handbook on Repair and Rehabilitation of R.C.C. Structures, Structural audit of existing buildings	Director general I.H. Shah	(Works) Central public works department, Government of India	1st	2002
02	Repairs and rehabilitation of Concrete Structures	Poonam I. Modi	PHI Learning Pvt. Ltd.	1st	2016
03	Concrete Technology	M. L. Gambhir	McGrawHill Education Private Ltd.	5th	2017
04	Concrete Technology	A. N. Neville	Pearson Education Ltd.	2nd	2010



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Codes:

1. IS 516 (Part 5 - Non-Destructive Testing Section 2"Half-Cell Potentials of Uncoated Reinforcing Steel in Concrete"2021.
2. IS 13805: 2004; General Standard for Qualification and Certification of Non-Destructive Testing Personnel — Specification (First Revision)

Expt. No.	Title of Experiment
01	Assess the quality and strength of concrete by using rebound hammer test.
02	Assess the quality and strength of concrete with the help of ultrasonic plus velocity method.
03	Detection of location and diameter of the reinforcement in the RCC element by using rebar locator.
04	Determination of quality and strength of concrete with the help of concrete core Extraction and compression testing machine.
05	Identifying the corrosion of reinforcement in RCC element using half Cell Potential meter.
06	Visual inspection and structural audit report of building.
07	Visual inspection and structural audit report of steel structures or bridges.
08	Detailed structural audit report of visited structure.


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Course Details:

Class		T. Y. B. Tech, Sem. - VI	
Course Code and Course Title		2CVPE318, Safety Aspects in Civil Engineering	
Prerequisite/s		---	
Teaching Scheme: Lecture/ Practical		03/02	
Credits		04	
Evaluation Scheme	T	ISE / MSE / ESE	40/30/30
	P	ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVPE318_1	Discuss the importance of safety and different safety Acts for the given construction project as per safety standards and legislation
2CVPE318_2	Prepare the safety plan and safety management system for the given construction site using different norms of safety planning and management.
2CVPE318_3	Identify the different causes and precaution measures for construction sites with the help of accident programs, accident investigation methods and monitoring techniques.
2CVPE318_4	Select the safety measures for the different construction activities for a given construction project with the help of different norms and code provisions.
2CVPE318_5	Apply the proper safety precautions for different construction equipment with the help of their safety criteria.

Course Contents:

Course Contents:		Hrs.
Unit 1	Introduction to safety Safety, Importance of safety, safety committee and its function Safety and productivity- Role of Government- National Safety Council, role and responsibility of safety officers, duties of safety officers, safety sign and symbols.	06
Unit 2	Safety Standards and Legislation: ILO model code of safety regulation/legislation, factory Act, Workman's Compensation Act. Employer's insurance Act, Preventive Measures Factory Act. Study of various IS codes used for safety in different operations of construction and OSHA guidelines.	07
Unit 3	Accidents Types, Classification of Accidents, Causes, direct and indirect cost of accidents, objective of accident programs. Precautionary measures, accident investigation, emergency preparedness, Hazard Identification and Control, Hazard Assessment, Inspections and Monitoring Worksites.	06


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Unit 4	Safety Planning Purpose for planning, planning procedure, range of plans, safety policies, Elements of safety policy, implementation, Safety training, various safety equipment's, occupational hazards Safety Management system (SMS), Safety culture, Fire Audit, Safety Audit, Safety Assurance, Safety Promotion.	07
Unit 5	Safety in various construction Activities: Excavation, Scaffolding, False work, Roof work, Safety in Tunnelling, Safety in work over water, Demolition, Explosives, Fire Extinguisher- training and use, Self-Inspection Checklist, Workplace Hazardous Information System (WHMIS)	07
Unit 6	Safety in handling of construction machinery Selection, operation, inspection and testing of hoisting cranes, mobile cranes, tower cranes, tower-cranes crane inspection checklist builders hoist witches chain pully block use of conveyors- concrete mixer concrete vibrators safety in earth moving equipment's – excavators, dozer, loader dumpers motor grader concrete pumps welding machine use of portable electrical tools drills griding tools.	06

All Experiments are mandatory

Exp. No	Experiment details
1	Study of Safety Engineering Acts and Regulations.
2	Study of importance of safety equipment used on site by poster presentation.
3	Case study presentation on the current scenario of construction sites related to accidents and safety.
4	Case study presentation on safety precautions for different construction activities.
5	Presentation on safety precautions for various construction equipment.
6	Analysis of Construction Site Accidents: Causes and Cost Implications.
7	Development of a Safety Management System for Residential Construction Sites.
8	Design of safety management system for any industrial project.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Industrial Safety and Environment	Anupama prashar & Bansal	S.K. Kataria & Sons, New Delhi	4 th	2015
02	Safety Management in Construction	S.K. Bhattacharjee	Khanna Publication	1 st	2011
03	Handbook of construction safety and management	Bureau of Indian Standards SP70:2001			


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04	Concerned IS- 10386-1 for Safety in Construction	Bureau of Indian Standards, 2015.
05	Major Safety Control: A practical Manual	National Safety Council, India 1993

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Hand book of OSHA Construction safety & Health	Charles D.Reese & James V. Edison.	CRS Press	3 rd	2008
02	Safety Management in Construction Industry	A Manual for Project Managers NICMAR, Mumbai.	NICMAR, Mumbai.	-	2016
03	Safety – health and working condition	Training Manual, National Safety Council, Mumbai, 2000.			
04	Safety Health & Welfare Manual	International Labour Organization, 2002			
05	Concerned IS for safety in construction	Bureau of Indian Standards.			


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Course Details:

Class		T. Y. B. Tech. Sem. -VI
Course Code and Course Title		2CVPE319, Sustainable Management of Solid Waste
Prerequisites		2CVHS206, Environmental Studies
Teaching Scheme: Lecture/Practical/ Tutorial		03/02/00
Credits		04
Evaluation Scheme	T	ISE / MSE / ESE 40/30/30
	P	ISE 50


Course Outcomes (COs):

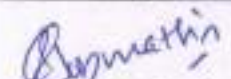
Upon successful completion of this course, the student will be able to:

2CVPE219_1	Apply the fundamentals of solid waste management, as the tool for of sustainable development by analysing its environmental and health impacts.
2CVPE219_2	Choose strategies for waste minimization, source separation, and collection optimization to effectively manage solid waste in diverse settings.
2CVPE219_3	Design integrated solid waste management plans and policies that promote waste reduction, recycling, and resource recovery, while minimizing environmental pollution and public health risks.
2CVPE219_4	Recommend practical solutions for sustainable solid waste management in real-world settings.
2CVPE219_5	Make use of the municipal solid waste rules and government initiatives as a tool for solid waste management.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Solid Waste Management Solid waste Sources, Types, Composition, Environmental and health considerations in solid waste treatment processes. Solid Waste Management objectives, Functional elements, Present scenario of municipal solid waste management in India, Typical values for solid waste generation in Indian cities Overview of solid waste treatment methods: incineration, composting, anaerobic digestion, landfilling.	7
Unit 2	Collection, transfer and transport of solid waste Storage and collection: General considerations for waste storage at source, Methods and equipment for solid waste collection: manual collection, mechanized collection, collection vehicles. Transportation of solid waste: Means and methods, Planning and optimization of waste collection routes. Transfer station: Need, Types, factors affecting Capacity, Location and	6


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	economic Viability.	
Unit 3	<p>Solid Waste Treatment approaches Waste Processing Techniques: Purpose, Mechanical volume and size reduction, component separation techniques. Material Recovery and Recycling: Objectives, Recycling program elements, commonly recycled materials and processes. Introduction to the global plastic and e-waste crisis, Introduction to plastic and e-waste management approaches, Extended Producer Responsibility (EPR) programs.</p>	7
Unit 4	<p>Recovery of Conversion Products Energy recovery from solid waste: Parameters affecting, Fundamentals of thermal processing, Pyrolysis, Incineration, Refuse derived fuels, Energy recovery, case studies under Indian conditions. Composting: Benefits, Factors affecting properties of compost, Processes, Stages, Technologies. Vermicomposting, Mechanical composting, In-vessel composting and Bio-methanation.</p>	7
Unit 5	<p>Sanitary Landfilling Dumpsites: Problems associated with dumpsites, Management, Dumpsite rehabilitation, Bio-mining of dumpsites. Sanitary Landfills. Site selection, Types, Principle, Processes, Land filling methods, Design and operation of solid waste treatment facilities, Landfill Liners, Leachate and landfill gas management, closure, post-closure plans.</p>	6
Unit 6	<p>Municipal Solid Waste Rules and Government Initiatives Waste Management legislation in India, MSWM Rules 2016, Role of CPCB and SPCB in management of solid waste. Legislation for biomedical and construction and demolition waste management. Integrated solid waste management approaches: waste-to-energy, circular economy models</p>	6

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Solid Waste Management: Principles and Practice	Chandruppa R. and Das D. B	Springer Science & Business Media	1 st	2012
02	Integrated Solid Waste Management	Tchobanoglous G., Theisen H., Vigil S.	McGraw Hill	2 nd	2014
03	Plastics Waste Management: Processing and Disposal	Subramanian M. N.	Wiley publications	2 nd	2019


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04	Municipal Solid Waste Management in India-A Compendium Report	--	ICEASD and TERI, New Delhi	--	2022
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Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Handbook of Solid Waste Management,	George Tchobanoglous Frank Kreith	McGraw Hill Education	2 nd	2002
02	Environmental Engineering	Howard S. Peavy, Donald R. Rowe, George Tchobanoglous	McGraw Hill Education	1 st	2017
03	Solid Waste Engineering: A Global Perspective	William A. Worrell, P. Arne Vesilind, and Christian Ludwig	Cengage Learning	3 rd	2016
04	Industrial Solid Wastes	Patwardhan A D	The Energy and Resources Institute (RERI), New Delhi	--	2013

Codes:

1. Manual on Municipal Solid Waste Management, CPHEEO, Ministry of Housing and Urban Affairs Development, Govt., of India, New Delhi, 2016.
2. The Solid Waste Management Rules, 2016, Ministry of Environment, Forest and Climate Change, New Delhi, 2016

Course Contents:

The students in a group of 4 to 5 are to perform the case study and prepare the solid waste management plan for small community/colony/village. The task can be divided under following 4 activities

Activity 1: Preliminary Research and Data Collection

Activity 2: Waste Characterization and Analysis

Activity 3: Identification of Waste Management Issues and Challenges

Activity 4: Development of a Waste Management Plan and Implementation Strategy.

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Course Details:

Class		T. Y. B. Tech. Sem.-VI
Course Code and Course Title		2CVPE320, Smart Cities
Prerequisites		2CVPC303
Teaching Scheme: Lecture/Tutorial/Laboratory		03/00/02
Credits		04
Evaluation Scheme	T	ISE / MSE / ESE
	P	ISE
		40/30/30
		50

Course Outcomes (COs):

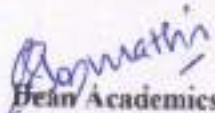
Upon successful completion of this course, the student will be able to:

2CVPE320_1	Identify the roles of different organizations for the planning of towns based on their development plans.
2CVPE320_2	Make use of regional plan and development plan for a town using various surveys.
2CVPE320_3	Utilize different government acts for planning of a town based on town planning schemes.
2CVPE320_4	Understand the concept of smart cities and understand national and global policies to implement for smart city development.
2CVPE320_5	Apply planning and design techniques to different smart cities in India.
2CVPE320_6	Evaluate smart transport system for smart cities by considering their applications.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Town Development Theories: Objective of town planning, principles, stages in town development, brief history, growth of towns and theories of developments (ribbon, sector zone, concentric, multiple zones etc.), Institutional arrangements in Maharashtra (CIDCO, MMRDA, MHADA, SRA, TPVD etc.)	04
Unit 2	Regional and Development Plan: Need of contents of Regional Plan, Regional Delimitation, Surveys necessary for Regional Plan, Analysis and Projections, Necessary Steps for starting and ending the process of Regional Planning, Relation with the state Plan and surroundings. Surveys, types, duration etc., Analysis and Projections, Demographic Projections, Goals and objectives, Public Participation, Implementation and Financial Aspects, Delineation, Relation with R.P., Content of DP and Planning norms, Modifications, purchase notice, Legal and Administrative process to start D.P.	08
Unit 3	Town Planning Scheme: Concept of T.P.S, Legal Provision, Relation with D.P., Original Plot, final Plot, Semi-final Plot, Incremental Contribution (Betterment charge), Rationale for charging Incremental Contribution, Function of Arbitrator, Advance Possession, Amenities, partially beneficial, Cost of Scheme. Municipal Act, MR and TP Act 1966, LA Act, 1894, LARA 2013, SEZ, DCR.	08
Unit 4	Introduction to Smart Cities: Definition, Concept, Need and importance, Benefits of smart cities, History of Smart city in India, Features & components of a smart city, Characteristics and factors of smart cities, Smart structures, Classification of smart structures, Challenges faced in developing smart cities.	09


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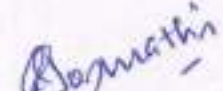

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	Scope of smart cities, Worldwide Policies for Smart City. Government of India: India "100 Smart Cities" Policy and Mission, Smart Cities in India, Case Studies of Smart City	
Unit 5	Planning and Management of Smart Cities: Dimension of Smart Cities, Smart Construction, Planning & Design, Theory and principles, Sustainable Building-Housing, Introduction to Green Buildings, Features of green building rating systems in India: LEED, GRIHA, Energy Saving System, Solar Energy for Smart City, Project Management.	06
Unit 6	Transportation System Management in Smart Cities: Smart Vehicles and Fuels, Intelligent Transportation System: Weigh –In motion, Variable Message Signs, GIS, GPS, Navigation System, Traffic Safety Management, Mobility Services, E-Ticketing etc.	04

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Town and country Planning	G.K. Hiraskar & K. G. Hiraskar	Dhanpat Rai Publication (p) Ltd., New Delhi.	19 th	2018
02	Town Planning	S.C. Rangawala	Charotar Publications, Pune	13 th	2018
03	Urban Planning and cultural identity	William J. V. Neill	Routledge, London	2 nd	2020
04	Inclusive and sustainable urban planning: a guide for municipalities	UN-Habitat	United Nations Human Settlements Programme	1 st	2018

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Traffic Engineering and Transport Planning	Kadiyalai, L. R.	Khanna publishers	8 th	2013
02	Rural development Planning – Design and method	Misra S.N.	Satvahan Publications New Delhi	8 th	2009
03	Draft Concept Note on Smart City Scheme	-	Government of India - Ministry of Urban Development	-	-
04	A city for all: valuing differences and working with diversity	Jo Beall	Zed books limited, London	5 th	2017


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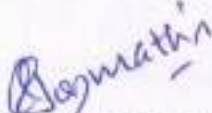

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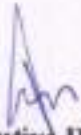


Smart Cities Laboratory Course Contents:	
Expt. No.	Title of Experiment
1	Mini Project
	Identify the town for development planning based on SWOC analysis.
	Conduct surveys for regional plan and development plan.
	Apply different planning schemes based on various acts.
	Prepare the final report and presentation on projected cost analysis
	Model preparation on smart city
2	Assignments
	Technology involved in different construction of smart building.
	Smart material associated with smart building
3	Case Studies
	Case study on smart city


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Course Details:

Class		B. Tech, Sem. - VI (Elective)
Course Code and Course Title		2CVPE321, Engineering Geology
Prerequisite/s		2CVPC302
Teaching Scheme: Lecture/Tutorial		03/00
Credits		03
Evaluation Scheme	T	ISE / MSE / ESE
	P	ISE
		40/30/30
		50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVPE321_1	Apply the knowledge of engineering geology for identification of suitable site for construction depending on physical and chemical properties of minerals and rocks and different geological structures like strike, dip, fold, fault.
2CVPE321_2	Draw cross section structural map to know the subsurface lithology of the area on the basis of given data.
2CVPE321_3	Compare types of aquifers, landslides and seismic waves to acquire knowledge about groundwater, landslides and earthquake respectively based on rock types and its mechanical properties.
2CVPE321_4	Evaluate suitable and unsuitable sites to construct major civil structures like dam, tunnel and bridges on the basis of surface and subsurface investigation method.
2CVPE321_5	Compare types of aquifers, landslides and seismic waves to acquire knowledge about groundwater, landslides and earthquake respectively based on rock types and its mechanical properties.
2CVPE321_6	Interpret field characteristics of minerals and rocks through detail report of field work to showcase properties and structures.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction & Physical Geology: Definition, Branches of geology useful to civil engineering, Importance of geology from Civil Engineering point of view, Case studies of case histories of failure of some civil engineering structures due to geological draw backs. Interior of the Earth Weathering - Types and civil engineering significance. River and its action.	07
Unit 2	Mineralogy & Petrology: Classification of minerals, physical properties of minerals, use of minerals in the production of construction material Igneous rocks: Origin, Concordant and discordant forms, Civil Engineering significance. Secondary rocks: Process of formation, Classification, Civil Engineering significance. Metamorphic rocks: Agents and Types of Metamorphism, Civil Engineering	07

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	significance.	
Unit 3	Structural Geology: Strike and Dip & Civil Engineering significance. Unconformity-Types & Civil Engineering significance. Fold and Fault: Parameters, Types, Causes, Civil Engineering significance. Joint: Types, Civil Engineering considerations.	06
Unit 4	Dynamic Geology & Groundwater: Earthquake: Terminology, Causes, Seismic waves, Seismograph, Seismogram, Scale, Effects, RIS. Landslides: Types, Causes, Prevention of Landslides, Groundwater: Sources of groundwater, Zones of groundwater, Types of Aquifers, porosity & permeability. Building Stones: Engineering properties of rocks, Requirement of good building stone.	07
Unit 5	Geological Investigations: Preliminary Geological Investigations Exploratory drilling: Observations, Preservation of cores and Core logging, Core recovery, R.Q.D. Geology of Tunnel and Bridge: Difficulties during tunneling Influence of geological conditions on tunneling, Geological consideration while choosing tunnel alignment, Tunnel in folded strata, sedimentary rocks and Deccan traps. Dependence of types of bridges on geological conditions.	06
Unit 6	Geology of Dams and Reservoirs: Influence of geological conditions on Location, Alignment, Design and Type of a dam, Suitable and Unsuitable geological conditions for locating a dam site, Dams on carbonate rocks, sedimentary rocks, folded strata and Deccan traps, Suitable and unsuitable geological conditions for reservoir site.	06

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Engineering Geology	S. K. Duggal, H. K. Pandey and Rawat	McGraw Hill	1 st	2014
02	Textbook Of Engineering Geology	N Chenna Kesavulu	Laxmi Publications	1 st	2013
03	Engineering and General Geology	Prabin Singh, S. K.	Katariya and sons, Delhi	8 th	2018
04	A Text book of Applied Engineering Geology.	M. T. Maruthesha Reddy	New Age International Publishers, New Delhi	1 st	2016
05	Engineering Geology	A Parthasarathy	John Wiley	1 st	2013


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06	A Text Book of Geology	G. B Mahapatra	CBS Publication	2 nd	2013
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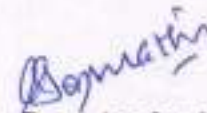
Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Geology Basics for Engineers	Parriaux A	TAYLOR & FRANCIS LTD	2 nd	2019
02	Geological Engineering	Vallejo Luis Gonzalez De El Al	CRC Press	1 st	2018
03	Principles Of Engineering Geology	Jerome V.	John Wiley	2 nd	2011
04	Engineering Geology for Civil Engineers	Varghese P. C.	Prentice Hall India Learning Private Limited	1 st	2012
05	Engineering Geology	Anil Kumar Mishra	S. Chand Publication	1 st	2013
06	Introduction to Rock Mechanics	Verma B. P.	Khanna Publisher Delhi	3 rd	2014


Engineering Geology Laboratory Course Contents:

Sr. No.	Title of Experiment
1.	Megascopic study of Rock forming minerals.
2.	Megascopic study of Ore forming minerals.
3.	Megascopic study of Igneous rocks.
4.	Megascopic study of Secondary rocks.
5.	Megascopic study of Metamorphic rocks.
6.	Study of geological maps a) Single horizontal series.
7.	Study of geological maps b) Single inclined series.
8.	Study of geological maps c) One horizontal and one inclined series.
9.	Study of geological maps d) Both series are inclined.
10.	Study of geological maps e) Both series are inclined with sill.
11.	Study of geological maps f) Both series are inclined with dyke.
12.	Study of 3D structural models.
13.	Study tour to the places of Engineering Geological importance.


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Course Details:

Class	T. Y. B. Tech. Sem.-VI
Course Code and Course Title	2CVSA322, Remote Sensing and GIS
Prerequisites	2CVSA213, 2CVSA309
Teaching Scheme: Lecture/Tutorial	03/00
Credits	03
Evaluation Scheme: ISE /MSE / ESE	40/30/30

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVSA322_1	Analyze remote sensing data to identify patterns and trends of spatial data using GIS tools.
2CVSA322_2	Evaluate the effectiveness of different remote sensing techniques in solving engineering problems using spatial analysis tools.
2CVSA322_3	Apply GIS methods to solve spatial problems encountered in diverse engineering domains using remote sensing data.
2CVSA322_4	Create maps and visualizations to communicate spatial information effectively using GIS Software's.
2CVSA322_5	Demonstrate an understanding of the principles behind remote sensing and GIS technologies using GIS based applications.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Introduction to Remote Sensing: Overview of Remote Sensing, Electromagnetic Spectrum and Remote Sensing, Types of Remote Sensing Platforms (Satellites, Aircraft, UAVs), Types of Remote Sensing Sensors (Passive vs. Active), Remote Sensing Image Acquisition and Processing.	07
Unit 2	Remote Sensing Data Analysis: Image Interpretation Techniques, Image Enhancement and Classification, Digital Image Processing Methods, Introduction to Image Analysis Software (e.g., ENVI, ERDAS Imagine)	07
Unit 3	Geographic Information Systems (GIS) Fundamentals: Introduction to GIS, Basic Concepts of Spatial Data, GIS Data Models (Raster vs. Vector), Coordinate Systems and Map Projections, GIS Data Collection Methods	06
Unit 4	GIS Data Analysis: Spatial Analysis Techniques (Overlay, Buffering, Interpolation), Attribute Data Analysis, Introduction to GIS Software (e.g., ArcGIS, QGIS), Hands-on Exercises on GIS Data Analysis	06



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Unit 5	Integration of Remote Sensing and GIS: Remote Sensing Data Integration with GIS, Applications of Remote Sensing and GIS in Engineering Domains (e.g., Agriculture, Urban Planning, Environmental Engineering), Case Studies and Examples of Remote Sensing and GIS Integration Projects	06
Unit 6	Advanced Topics and Applications: Remote Sensing and GIS in Disaster Management, Remote Sensing and GIS in Climate Change Studies, Emerging Trends in Remote Sensing and GIS Technology, Future Directions and Career Opportunities in Remote Sensing and GIS	07


Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Remote Sensing and GIS	Basudeb Bhatta	Oxford University Press	1 st	2017
02	Remote Sensing and GIS Integration: Theories, Methods, and Applications	Qihao Weng	McGraw-Hill Education	1 st	2009
03	Principles of Remote Sensing	Floyd F. Sabius	American Society for Photogrammetry and Remote Sensing	1 st	2007
04	Remote Sensing and Image Interpretation	Thomas Lillesand, Ralph W. Kiefer, and Jonathan Chipman	Wiley	8 th	2014


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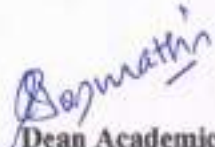

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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	GIS and Remote Sensing Applications in Biogeography and Ecology	Edited by Andrew C. Millington, Stephen J. Walsh, and Patrick E. Osborne	Springer	2 nd	2009
02	Geographic Information Systems: Principles, Techniques, Management and Applications	P. A. Burrough and R. A. McDonnell	Oxford University Press	1 st	2015
03	Remote Sensing of the Environment: An Earth Resource Perspective	John R. Jensen	Pearson	2 nd	2007
04	Introduction to Remote Sensing	James B. Campbell and Randolph H. Wynne	Guilford Press	5 th	2011


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Course Details:

Class	T. Y. B. Tech. Sem. -VI
Course Code and Course Title	2CVEN323, Solid Waste Management
Prerequisites	2CVHS206, Environmental Studies
Teaching Scheme: Lecture/Practical/ Tutorial	03/00/00
Credits	03
Evaluation Scheme: ISE /MSE / ESE	40/30/30


Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVEN323_1	Apply various methods for the quantitative assessment of solid waste and its sampling and characterization techniques.
2CVEN323_2	Analyse collection routes to enhance the efficiency of solid waste collection services.
2CVEN323_3	Select transport means and collection routes for solid waste transfer operations.
2CVEN323_4	Select waste treatment process to enhance the efficiency and effectiveness of solid waste management systems.
2CVEN323_5	Develop expertise in managing hazardous waste, including understanding its sources, classification, and treatment options.
2CVEN323_6	Classify hazardous waste, using its properties to treat & dispose it safely.

Course Contents:

Unit No.	Title	Hrs.
Unit 1	Sources and Characterization Definition - Sources and types of solid waste- composition and its determinants of Solid waste-factors influencing generation-quantity assessment of solid wastes-methods of sampling and characterization.	07
Unit 2	Collection and Transport Collection of Solid waste, collection services, collection system, equipment, time and frequency of collection, labour requirement, factors affecting collection, analysis of collection system, collection routes, route optimization, preparation of master schedules.	06
Unit 3	Transfer and Transport Need for transfer operation, transfer stations, types, transport means and methods, location of transport stations, Manpower requirement, collection routes; Transfer stations, selection of location, types & design requirements, operation & maintenance.	07
Unit 4	Processing Techniques and Energy Recovery Processing techniques, purposes mechanical volume reduction, necessary	07


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	equipment, chemical volume reduction, incinerators, mechanical size reduction selection of equipment's, components separation, methods, drying and de-watering. Recovery of Resources, conversion products and energy recovery, recoverable materials, processing and recovery systems, incineration with heat recovery.	
Unit 5	Treatment and Disposal Treatment methods, various methods of refuse processing, recovery, recycle and reuse, composting, aerobic and anaerobic, incineration, pyrolysis and energy recovery. Disposal methods, Impacts of open dumping, site selection, sanitary land filling, design criteria and design examples, leachate and gas collection systems, leachate treatment.	06
Unit 6	Biomedical, Hazardous & E-Waste Biomedical Waste management, sources, treatment and disposal Hazardous Waste Management- Introduction, Sources, Classification, Physico-chemical, Chemical and Biological Treatment of hazardous waste, regulations. E-waste management - sources, treatment and disposal	06

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
01	Solid Waste Management: Principles and Practice	Chandrappa R. and Das D. B	Springer Science & Business Media	2 nd	2024
02	Introduction to Solid Waste Management	Rajaraman Krishnamurthy and Rajeshwari Ramachandran	CRC Press	1 st	2018
03	Plastics Waste Management: Processing and Disposal	Subramanian M. N.	Wiley publications	2 nd	2019
04	Municipal Solid Waste Management in India-A Compendium Report	--	International Centre for Environment Audit and Sustainable Development and The Energy and Resources Institute (TERI), New Delhi	--	2022


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Reference Books:						
Sr. No.	Title	Author	Publisher	Edition	Year of Edition	
01	Sustainable Solid Waste Management	Syeda Azeem Unnisa and S. Bhupatthi Rav	Routledge	1 st	2020	
02	Environmental Engineering	Howard S. Peavy, Donald R. Rowe, George Tchobanoglous	McGraw Hill Education	1 st	2017	
03	Solid Waste Engineering: A Global Perspective	William A. Worrell, P. Aarne Vesilind, and Christian Ludwig	Cengage Learning	3 rd	2020	
04	Solid Waste Management: Principles and Practice	R. Chandrappa and D.B. Das	Springer	1 st	2012	


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Course Details:

Class	T.Y.B. Tech, Sem.-VI
Course Code and Course Title	2CVVS324, Structural Design And Drawing – I (Mini Project)
Prerequisite/s	2CVVS301
Teaching Scheme: Practical	02
Credits	01
Evaluation Scheme: ISE/ ESE	50/50


Course Outcomes: Upon successful completion of this course, the student will be able to analyze and design the following steel structures as per BIS 800: 2007 (General Construction in Steel):

2CVVS324_1	Discuss different types truss, components of trusses and loads for industrial shed as per IS code provision.
2CVVS324_2	Compute the components of given project by using analytical methods
2CVVS324_3	Design the components analytically of given project by using Limit state method
2CVVS324_4	Make a drawing designed components of given project using modern tools /Autocad.
2CVVS324_5	Analyse and design the components of given project by using Finite element software.

Course Contents:

The term work shall consist of detailed structural design and drawing of the following steel structure along with necessary drawings.

01	<p>INDUSTRIAL SHED</p> <p>Design of industrial shed including roof truss (Roof truss: assessment of dead load, live load and wind load, Load calculation by graphical method, design of purlin, design of members of a truss, detailing of typical joints and supports), purlin, gantry girder (Design of gantry girder: Selection of gantry girder, design of cross-section, check for moment capacity, buckling resistance, bi-axial bending, deflection at working load and fatigue strength), roof and gantry columns, bracing system, column bases and connections.</p>
02	<p>ANY ONE OF THE FOLLOWING:</p> <p>a) WELDED PLATE GIRDER: Design of welded plate girder, the design of cross section, curtailment of flange plates, stiffeners and their connections.</p> <p>b) FOOTBRIDGE Influence lines, cross beam, main truss, Raker, joint Details, support details</p> <p>c) BUILDING FRAMES Building with Secondary and main beams, column and column bases, beam-to-beam connection, column-beam-connection, the design of typical members. Secondary and main</p>


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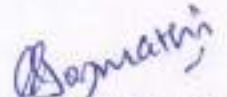

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	beam arrangement for the floor of a building, design of beam to beam and beam to column connections using bolt / weld.
Term work will consist of the following.	
Four full imperial size drawing sheet showing structural detailing of sketches based on the syllabus.	
A.	Design of industrial building including roof truss, purlin, bracings, gantry girder, column, column base, and connections. Three full imperial size drawing sheets.
B.	Design of welded plate girder the design of cross section, curtailment of flange plates, stiffeners and connections. One full imperial size drawing sheets.
OR	
B.	Design of foot Bridge including Influence lines, cross beam, main truss, Raker, joint Details, support details. One full imperial size drawing sheets.
OR	
B.	Design of Building Frame including Secondary and main beams, column and column bases, beam-to-beam connection, column-beam-connection, the design of typical members. Secondary and main beam arrangement for the floor of a building, design of beam to beam and beam to column connections using bolt / weld. One full imperial size drawing sheets.
Note:	
Sample verification of analysis results shall be made by using software for any one problem.	
For drawing sheets use Auto-Cad software, if necessary, wherever use hand drawing sheets	
A maximum number of students in a group not more than two (02) for design	
4. Two site visits on selected design: Report should contain structural details with the sketch	


Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Design of Steel Structures	S. K. Duggal	Tata McGraw Hill	9	2012
02	Design of steel structure by Limit State Method as per IS: 800- 2007	Bhavikatti S. S	I K International Publishing House, New Delhi	4	2015
03	Design of Steel Structures,	K.S. Sairam,	Pearson	1	2010
04	Limit State Design in Structural Steel	Dr. M. R. Shiyekar.	PHI publications	2 nd	2016
05	Design of Steel Structures	Dr. N. Subramanian	Oxford	9 th Impression	2012


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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Design of Steel Structures	Edwin H. Gaylord, Charles N. Gaylord James, Stallmeyer	Mc-Graw-Hill	3	2010
02	Design of Steel Structures	Dr. V.L.Shah	Stures publications	4	2015
03	Design of Steel Structures	Punmia, A. K. Jain and Arun Kumar Jain,	Laxmi Publication	2	2011
04	Design of Steel Structures	Dayaratnam,	Wheeler Publications , New Delhi	2	1998

Codes:

IS 800-2007 , Indian Standard Code

IS 875 Part I, II, III, Indian Standard Code

I.S Handbook I(Steel table)



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Course Details:

Class	T. Y. B. Tech, Sem.-VI
Course Code and Course Title	2CVEL325, Software Training I
Prerequisite/s	---
Teaching Scheme: Lecture/Tutorial/Practical	00/00/02
Credits	01
Evaluation Scheme: ISE	50


Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

ICVES368_1	Apply software skills in the field of Civil Engineering.
ICVES368_2	Perform structural analysis and evaluate results.
ICVES368_3	Compute various technical parameters with the help of software.
ICVES368_4	Prepare professional reports and presentations.
ICVES368_5	Apply software tools for interpreting and utilizing geospatial data in civil engineering applications.

Course Contents:

	The lab work shall consist of Software training . List of Software training floated by Department will be in the field of: <ol style="list-style-type: none"> 1. Structural Design 2. Construction Planning and Management 3. Transportation Engineering 4. Environmental Engineering 5. Quantity Estimation 6. Geospatial Data Management and Analysis
1	<ol style="list-style-type: none"> 1. Structural Design (Staad Pro, E-Tab etc.) 2. Analysis & design of structural members and System by any design software. 3. Construction Planning and Management (MSP, Primavera, etc.) 4. Planning of all construction activity and management of them by any software. 5. Transportation Engineering (IIT pave, VISSIM, etc.) Analysis and Design of pavement by any Software. 6. Environmental Engineering (EPANET, etc.) Pipe network analysis. 7. Geospatial Data Management and Analysis (QGIS etc.)



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Course Details:

Class	T. Y. B. Tech, Sem.-VI
Course Code and Course Title	2CVCC326, Reasoning and Soft Skill Part - IV
Prerequisite/s	2CVCC313,
Teaching Scheme: Lecture/Tutorial/Practical	00/00/02
Credits	01
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

2CVCC326_1	Solve problem based on basic and advance probability, Permutation and Combination
2CVCC326_2	Solve problem based on Syllogism, graphs, data interpretations
2CVCC326_3	Solve problem based on gaming round
2CVCC326_4	Demonstrate on Resume writing skill, closed, advanced grammar, Synonyms and Antonyms

Course Syllabus

Course Contents:		
Unit No.	Title	Hrs.
Unit 1	Advance Probability Advance Permutation Combination	04
Unit 2	Statement Assumption Syllogism	04
Unit 3	Mixed Bar Graph, Pie Chart Data Interpretation (Avg & Ratio Proportion based)	04
Unit 4	Gaming Round OR Capping Part 1 Gaming Round OR Capping Part 2	04
Unit 5	Company Specific Revision for arithmetic (S.T.D., Time Rate Work) Revision of Calendar Reminder theorem Power Cycle	04
Unit 6	Verbal Ability Revision Part 1 Verbal Ability Revision Part 2 Interview Etiquettes & Grooming	04


Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Quantitative Aptitude for Competitive Examinations	R.S. Agarwal	S Chand	Revised	2022
02	A Modern Approach to Verbal & Non-Verbal Reasoning	R.S. Agarwal	S Chand	Revised	2024
03	English Grammar and Composition (Verbal, Grammar)	P. C. Wren and H Martin	S Chand	2 nd	2019


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